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Superseding
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Part I Section 3

FEDERAL STANDARD

SCREW-THREAD STANDARDS FOR FEDERAL SERVICES
SECTION 3

UNIFIED THREADS OF SPECIAL DIAMETERS,
PITCHES, AND LENGTHS OF ENGAGEMENT

This standard was approved by the Commissioner Federal Supply Service, General Services Administration, for the use of all Federal agencies.

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FSC THDS

INFORMATION SHEET ON FEDERAL STANDARDS

This Federal Standard is issued in loose leaf form to permit the insertion or removal of new or revised pages and sections.

All Users of Federal Standards should keep them up to date by inserting revised or new pages as issued and removing superseded and cancelled pages.

New and revised pages will be issued under Change Notices which will be numbered consecutively and will bear the date of issuance. Change Notices should be retained and filed in front of the Standard until such time as they are superseded by a reissue of the entire Standard.

NOTICE

From 1939, the Interdepartmental Screw-Thread Committee (ISTC), under the Chairmanship of the National Bureau of Standards (NBS), Department of Commerce had developed and published NBS Handbook H28, Screw-Thread Standards for Federal Services.

Section 487 of Title 40 of the U.S. Code states that the authority for development of Federal Standards for procurement purposes rests with the General Services Administration (GSA).

In November 1976, the ISTC was terminated, and the General Services Administration (GSA) accepted the responsibility for NBS Handbook H28 and agreed to convert it and maintain it as a Federal Standard.

The standards which had been published as NBS Handbook H28, Part I, Part II and Part III will now be promulgated as a fully coordinated FED-STD-H28, maintaining the existing sections and identifying them with slant lines. For example, NBS Handbook H28, Part I, Section 3 will be detailed standard FED-STD-H28/3 which must be procured individually.

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The text of this section is reprinted from the NBS HANDBOOK H28 with minor editorial corrections. Page 5 contain corrections indicated by an asterisk.

Reorganization of the document from NBS HANDBOOK H28 to FED-STD-H28 creates an editorial inconvenience, when maintaining continuity of cross references amongst the pages, paragraphs, tables and figures of the different sections. For this standard individual sections will be numbered sequentially starting with (1) one. If the reprinted text refers to another page, such as Page 6.3, this will be understood to mean section 6 page 3. All figures and tables will maintain the established designations, prefixed with the section; e.g. Table 3.1 and Figure 2.5 to identify their location in this standard. All appendices will be incorporated in the basic document FED-STD-H28 with other general information and will continue to be identified with the prefix A.

1. INTRODUCTION

The thread series, tolerances, and allowances specified in section 2 of H28 apply in general to bolts, nuts, and tapped holes of standard pitches and diameters. In addition, there are large quantities of threaded parts produced where the relations of diameter to pitch are necessarily different from those of the standard thread series, and the lengths of engagement either shorter or longer than for bolt and nut practice. Such threads are designated "threads of special diameters, pitches, and lengths of engagement". Selected combinations of Unified special screw threads are listed in table 3.1. Pitch diameter tolerances in this table are based on a length of thread engagement of 9 times the pitch. The pitch diameter limits are applicable to a length of engagement of from 5 to 15 times the pitch. (This should not be confused with the length of thread on mating parts, as it may exceed the length of engagement by a considerable amount.)

2. TYPES OF SPECIAL THREADS

There are various degrees of specialization in the design of special threads that may be classified as follows:

(1) A standard thread that is modified by the inclusion of some nonstandard feature as discussed in section 2,

(2) A thread of a standard diameter such as is found in one or more of the thread series in section 2 associated with a standard pitch listed in table 2.1 forming a diameter-pitch combination that is not in a standard thread series; for example, 1.000-10 UNS,

(3) A diameter of odd size such as 1.137 in. associated with a standard pitch.

(4) A thread of either standard or nonstandard diameter associated with a nonstandard pitch; for example, 1.000-15 UNS or .895-26 UNS,

(5) A thread of any of the first four degrees of specialization to which special tolerances are applied,

(6) A completely special thread that deviates from the standard Unified thread form.

In the interest of economy, the designer should adhere to standard threads or to thread features conforming as closely as possible to established standards. It should be remembered that special threads entail the design and manufacture of special threading tools and gages with consequent greater costs, increase in inventories, and difficulties in procuring spare parts when replacements are necessary.

In this section, standards for special threads are presented, including thread form, selected combinations of Unified special screw threads (table 3.1), allowances and tolerances, and detailed directions for specifying special threads on drawings. A discussion of factors affecting the design of special threads is presented in appendix A5.

3. UNIFIED FORM OF THREAD

The Unified form of thread profile as specified in section 2 shall be used.

4. PREFERRED DIAMETERS AND PITCHES

The use, whenever possible, of the standard series of screw threads listed in table 2.7 is recommended for all applications. Whenever sizes and pitches in table 2.7 are not suitable, the designer should, if possible, choose a thread from table 3.1 which lists selected combinations of Unified special screw threads. If a selection cannot be made from either table 2.7 or 3.1, consideration should be given to the following paragraphs in a choice of thread.

4.1. PREFERRED DIAMETERS.—Whenever possible, the basic diameter should be selected from series of diameter increments as follows:

Range	Diameter increments	
	First choice	Second choice
in 0.25 to 0.6	in 0.05	in 0.05
above 0.6 to 1.5	0.1	0.05
above 1.5 to 6.0	0.25	0.1
above 6 to 16	0.5	0.25
above 16 to 24	1.0	0.5

It is recommended that diameters less than 0.25 in conform to the standard sizes of screws under 0.25 in. as there is virtually no necessity for the selection of a diameter not included in those sizes. Furthermore, the coarse and fine thread series provide ample choice as to diameter-pitch combinations.

4.2. PREFERRED PITCHES.—Whenever possible, the pitch should be selected from the series 40, 36, 32, 28, 24, 20, 16, 12, 10, 8, 6, and 4 threads per inch. Intermediate pitches should be used only when absolutely necessary. Pitches coarser than 4 threads per inch are not recommended.

There are practical limits to both the largest and smallest diameters suitable for any pitch. The curves on the chart for determining minimum length of thread engagement in Appendix A5 stop at such limits.

4.3. BASIC THREAD DATA.—Basic thread data for standard pitches are given in table 2.1. These data are to be used in conjunction with the directions for specifying special threads on drawings as given in par. 5.4, p. 3.02.

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5. THREAD CLASSES

Thread classes are distinguished from each other by the amounts of tolerance and allowance. The function of these classes is to assure the interchangeability of threaded parts. Six distinct classes of screw threads have been established for general use. These classes are: 1A, 2A, and 3A (for external threads only) and 1B, 2B, and 3B (for internal threads only).

Class 1AR (for external threads only, 16 threads per inch and coarser) is also included for special use. Class 1AR is produced by combining the American National class 1 allowances with class 1A tolerances.

The disposition of the tolerances, allowances, and crest clearances for the six general use classes is illustrated in figures 2.5 and 2.6.

The requirements for a screw thread fit for a specific application can be met by specifying the proper combination of classes for the components. For example, an external thread made to class 2A limits can be used with an internal thread made to classes 1B, 2B, or 3B limits for specific applications.

5.1. CLASSES 1A, 1AR, and 1B.—The combinations of classes 1A or 1AR and 1B are intended to cover the manufacture of threaded parts where quick and easy assembly is necessary, and where an allowance is required to permit ready assembly, even when the threads are slightly bruised or dirty.

Maximum diameters of class 1A (external) threads are less than basic by the amount of the same allowance as applied to class 2A. For the intended applications in American practice the allowance is not available for plating or coating. Where the thread is plated or coated, special provisions are necessary. The minimum diameters of class 1B (internal) threads, whether or not plated or coated, are basic, affording no allowance or clearance for assembly with maximum material external thread components having maximum diameters which are basic.

Allowances for all diameters and pitch diameter tolerances are specified in tables 3.2, 3.3, and 3.6. Their application is shown in figure 2.5.

5.2. CLASSES 2A and 2B.—Classes 2A for external threads and 2B for internal threads are designed for general use. A moderate allowance is provided for class 2A threads.

The maximum diameters of class 2A (external) uncoated threads are less than basic by the amount of the allowance. The allowance minimizes galling and seizing in high-cycle wrench assembly, or it can be used to accommodate plated finishes or other coating. However, for threads with additive finish, the maximum diameters of class 2A may be exceeded by the amount of the allowance; i.e., the 2A maximum diameters apply to an unplated part or to a part before plating, whereas the basic diameters (the 2A maximum diameter plus allowance) apply to a part after plating. The minimum diameters of class 2B (internal) threads, whether or not plated or

coated, are basic, affording no allowance or clearance in assembly at maximum material limits.

Allowances for all diameters and pitch diameter tolerances are specified in tables 3.2, 3.4, and 3.7. Their application is shown in figure 2.5.

5.3. CLASSES 3A AND 3B.—Classes 3A for external threads and 3B for internal threads provides for applications where closeness of fit and accuracy of lead and angle of thread are important. They are obtainable consistently only by the use of high quality production equipment supported by a very efficient system of gaging and inspection. The maximum diameters of class 3A (external) threads and the minimum diameters of class 3B (internal) threads, whether or not plated or coated, are basic, affording no allowance or clearance for assembly of maximum material components.

No allowance is provided, but since the tolerances on GO gages are within the limits of size of the product, the gages will assure a slight clearance between product made to the maximum-material limits. Pitch diameter tolerances are specified in tables 3.5 and 3.8. Their application is shown in figure 2.6.

5.4. SELECTION OF CLASS OF THREAD.—Consideration should first be given to the use of a class 2A external thread with a class 2B internal thread since these classes are designed for general use. The use of class 2A provides that there will always be a small clearance between maximum-material parts except when the external thread is plated. Plated parts are intended to be gaged with basic-size GO gages. In either case, it is expected that parts will assemble readily without galling or seizing. Tolerances are sufficiently large so that ordinary production methods are generally applicable.

Past experience with similar designs may indicate that a more accurately made or closer fitting thread is required than that which is permitted by classes 2A and 2B tolerances. In such cases consideration should be given to the use of classes 3A and 3B. The necessary increase in cost should not be overlooked.

In some designs there may be advantages in providing for greater average looseness of fit than that obtained with classes 2A and 2B. Such greater average looseness is provided by classes 1A and 1B or the assembly of class 1A external threads with class 2B internal threads. The minimum looseness, however, is the same as for classes 2A and 2B except that a positive allowance is provided for plated parts. When a greater minimum looseness is requisite to provide for adverse conditions of assembly, class 1AR is available, which is not a Unified class and is based on the American National class 1 allowance combined with class 1A tolerance. These classes also provide larger tolerances to the manufacturer, which may be of advantage if the thread is difficult to produce.

It should be noted that any class of external thread may be associated with any class of internal thread, there being no requirement to combine classes of like number.

6. ALLOWANCES

The allowance is minus and is applied from the basic size to below basic size. Allowance is applied only to the classes 1A, 1AR, and 2A external threads. Values of the allowance for classes 1A and 2A are obtained by use of a C factor of 0.3 in the formula shown in paragraph 7.3. Numerical values of classes 1A and 2A allowances for the commonly used pitches are listed in table 3.2.

The formula in paragraph 7.3 is not applicable to class 1AR as this class is produced by combining the American National class 1 allowances with class 1A tolerances. These allowances are larger than those for classes 1A and 2A and provide for ready assembly under adverse conditions.

Numerical values of class 1AR allowances are:

Threads per inch (tpi), n	Class 1AR allowance in
16	.0018
14	.0021
12	.0024
10	.0028
8	.0034
6	.0044
4	.0064

(Class 1AR allowances apply only to external threads, 16 tpi and coarser.)

7. TOLERANCES

The following general specifications apply to all classes specified for applications of the Unified form of thread.

7.1. UNIFORM MINIMUM INTERNAL THREAD.—The minimum major, pitch, and minor diameters of the internal thread are, respectively, the same for classes 1B, 2B, and 3B.

7.2. DIRECTION AND SCOPE OF TOLERANCES.—

(a) The tolerance on the internal thread is plus, and is applied from the basic size to above basic size.

(b) The tolerance on the external thread is minus and is applied from the maximum (or design) size to below the maximum size.

(c) The tolerances specified represent the extreme variations permitted on the product.

7.3. PITCH DIAMETER TOLERANCES.—The basic formula for pitch diameter tolerance is composed of the following increments:

P.D. Tolerance

$$= C(0.0015\sqrt{D} + 0.0015\sqrt{L} + 0.015\sqrt{p}),$$

where

C = a factor which differs for each class
 D = basic major diameter
 L = length of engagement
 p = pitch.

This formula is based on the accuracy of present day threading practice, and is applicable to all reasonable combinations of diameter, pitch, and length of engagement. Numerical values of the increments in the formula for standard diameters, pitches, and lengths of engagement are given in table 2.19. The values of factor C for pitch diameter tolerances are as follows:

Class	Factor C
1A and 1AR	1.500
1B	1.950
2A	1.000
2B	1.300
3A	0.750
3B	.975

It will be noted that the factor C is 30 percent greater for internal than for external threads of a given class number on account of the relative difficulties of manufacture.

Numerical values of pitch diameter tolerances for classes 1A, 1AR, 1B, 2A, 2B, 3A, and 3B are given in tables 3.3 through 3.8. Two sets of tolerances are given: Those for 5 to 15 pitches length of engagement, based on lengths of 9 pitches, and those for 16 to 30 pitches length of engagement, which are 1.25 times the 9-pitch values. For lengths of engagement over 30 pitches, it is recommended that pitch diameter tolerances 1.5 times the 9-pitch values be used. If excessively small or large lengths of engagement are encountered, the thread tolerances may be calculated from the formulas, if considered advisable. Also, for threads per inch not included in the tables, tolerances should be calculated by applying the formulas.

7.4. MAJOR DIAMETER TOLERANCES.—(a) External threads.—The tolerance on major diameter for special threads is not specified, as it must be determined in relation to the requirements of a given design in accordance with the procedure outlined in appendix A5. Preferred tolerances equal to $0.060 \sqrt{p}$ for classes 2A and 3A, and equal to $0.090 \sqrt{p}$ for classes 1A and 1AR are as follows:

Threads per inch	Major diameter tolerance	
	Classes 1A and 1AR, $0.090\sqrt{p^3}$	Classes 2A and 3A, $0.060\sqrt{p^3}$
80	in	in
72		.0032
64		.0036
56		.0038
48		.0041
44		.0045
40	.0077	.0051
36	.0063	.0055
32	.0089	.0060
28	.0098	.0065
27	.0100	.0067
24	.0108	.0072
20	.0122	.0081
18	.0131	.0087
16	.0142	.0094
14	.0155	.0103
12	.0172	.0114
10	.0194	.0129
8	.0225	.0150
6	.0273	.0182
4	.0357	.0238

(b) *Internal threads.*—The tolerance on major diameter is for reference only. It is equal to $H/6$ plus the pitch diameter tolerance of the class of thread involved. The maximum major diameter of the internal thread may be determined by adding $0.793857p$ ($= 11H/12$, table 2.1) to the maximum pitch diameter of the internal thread. However, this diameter shall not result in a root flat width less than $p/24$. In dimensioning internal threads the maximum major diameter is not specified, being established by the crest of an unworn tool. In practice, the major diameter of an internal thread is satisfactory when accepted by a gage or gaging method that represents the maximum material condition of an external thread which has no allowance.

7.5. MINOR DIAMETER TOLERANCES.—(a) *External threads.*—The tolerance on minor diameter of external threads is for reference only. At the nominal minor diameter, that is, at the intersection of the rounded root with its center line (see fig. 2.3) it equals the pitch diameter tolerance plus $H/12$ and applies only where the rounded root is a requirement of the design. Otherwise the tolerance shall be $H/4$ plus the pitch diameter tolerance. The minimum minor diameter of the external thread may be determined by subtracting $0.649519p$ ($= 0.75H$, table 2.1) from the minimum pitch diameter of the external thread. However, this diameter shall not result in a root flat width less than $p/8$. In dimensioning external threads the minimum minor diameter is not specified, being established by the crest of an unworn tool. In practice, the minor diameter of an external thread is satisfactory when accepted by

a gage or gaging method that represents the maximum-material condition of the internal thread less the allowances, if any.

(b) *Internal threads.*—Formulas for the internal thread minor diameter tolerances are shown in table 2.20. Numerical values for the tolerances are shown in tables 3.9 and 3.10. To reduce the number of minor diameter tolerances to a practical minimum, tolerances are shown in these tables for selected pitches and diameters. In these tables, the tolerances are as follows:

Length of engagement	Percent of formula value	Tolerance ratio
Less than $0.33D$	50%	0.5
From $0.33D$ to $0.67D$	75%	0.75
Over $0.67D$ to $1.5D$	100%	1.0
Over $1.5D$	125%	1.25

When the tolerance value so computed is more than $0.394p$, which corresponds to a resulting minimum thread height of 53 percent, the value is adjusted to equal $0.394p$.

8. LENGTH OF ENGAGEMENT

The values in tables 3.9 and 3.10 for lengths of engagement from $0.67D$ to $1.5D$, are suitable for general applications.

Some thread applications have lengths of engagement which are greater than 1.5 diameters or less than $0.67D$. For applications having shorter or longer lengths of engagement it may be advantageous to decrease or increase the internal thread minor diameter tolerance as explained below.

The principal practical factors that govern these tolerances are tapping difficulties, particularly tap breakage in the small sizes, availability of standard drill sizes in the medium and large sizes, and depth of engagement. Depth of engagement correlates with the stripping strength of the thread assembly, and thus also with the length of engagement. It also correlates with the tendency toward disengagement of the threads on one side when assembly is eccentric. The amount of possible eccentricity is one half of the sum of the pitch diameter allowance and tolerance on both mating threads. For a given pitch or height of thread this sum increases with the diameter, and accordingly this factor would require a decrease in minor diameter tolerance with increase in diameter. However, such decrease in tolerance often is not feasible without requiring special drill sizes; therefore, to be able to use as many as possible of the available standard drill sizes listed in USA B5.12, the minor diameter tolerance for classes 1B and 2B of a given pitch for 0.25 in. diameter and larger is constant, in accordance with the formula:

$$0.25p - 0.4p^3$$

There may be applications where the lengths of engagement of the mating threads or the combination of materials used for mating threads are such that the maximum tolerance may not provide the desired strength of the fastening. Experience has shown that for lengths of engagements less than $0.67D$ (the minimum thickness of standard nuts) the minor diameter tolerance may be reduced without causing tapping difficulties.

In other applications, the length of engagement of mating threads may be long because of design considerations or the combination of materials used for mating threads. As the threads engaged increase in number, their depth of engagement may be shallower and still develop stripping strength greater than the external thread breaking strength. In these cases the maximum tolerance should be increased to reduce the possibility of tapping difficulties.

Recommended internal thread minor diameter tolerances for various lengths of engagement are shown in tables 3.9 and 3.10. Recommended hole size limits before threading for different lengths of engagement are shown in appendix A3.

9. LIMITS OF SIZE

With respect to the pitch diameter limits of size, it is intended, except as hereinafter qualified, that no portion of the complete thread be permitted to project beyond the envelope defined by the maximum-material limits on the one hand, or beyond that defined by the minimum-material limits on the other, and thus be outside of the tolerance zone as illustrated in figures 2.5 and 2.6. The full tolerance cannot therefore, be used on pitch diameter unless deviations in other thread elements are zero.

Diameter equivalents of variations in lead, uniformity of helix, and flank angle are in the direction toward maximum material. Also included in pitch-diameter limits are other variations from size and profile, such as taper, out-of-round, and surface defects. Thus the maximum-material pitch diameter limits are a limitation of the virtual diameter (effective size) and are so specified herein for all thread classes. It is intended that diameter equivalents of deviations in any given element except pitch diameter should not exceed one-half of the pitch-diameter tolerance. Values are given in table 2.22 for deviations in lead and half-angle equivalent to one-half of pitch diameter tolerances. Flank angle equivalents should be based on a depth of thread engagement of $0.625H$.

Variations in taper and roundness of the pitch diameter, together with variations of the pitch diameter as a whole, may be in the direction of minimum material and thus the minimum-material pitch diameter limit may be specified as a limitation of the pitch diameter as a single element. However, in view of the interrelation of the pitch diameter, variations in lead and flank angle, etc., together with practical considerations relating to established production processes, product application and inspection procedures, except for class 3A, for

fasteners and some custom threaded parts, it is customary to base acceptance at the minimum-material condition (minimum pitch diameter of the external thread and maximum pitch diameter of the internal thread) on threaded plug and ring gaging, with gages to the thread form and length specified in section 6. See Dimensional acceptability of threads in that section.

10. METHOD OF DESIGNATING SPECIAL SCREW THREADS

For the method of designating threads of special diameters, pitches, and lengths of engagement, and UNS threads (threads with Unified tolerance formulations), see also section 2.

The symbol "UNS" is applicable to any thread,

- (1) having the basic Unified thread form,
- (2) with limits based on Unified formulations, and
- (3) which is not listed in table 2.7.

Selected combinations of UNS threads are listed in table 3.1.

11. DIRECTIONS FOR DETERMINING LIMITS OF SIZE OF SPECIAL THREADS

The following directions are intended to simplify the task of the designer or specification writer in preparing the specification for a special thread:

The procedure to be followed in determining values for the essential thread elements (as shown in fig. 3.12) and the associated tolerances, is outlined in table 3.11. The application of this and other tables is illustrated by the following example:

Internal thread, 2.500-28UNS-2B

Length of engagement, 1 in.

Min major diameter = 2.5000 in.

$$\begin{aligned} \text{Min pitch diameter} &= \text{basic major diameter} - \\ &\quad 0.75H \text{ (table 2.1)} \\ &= 2.5000 - 0.0232 = \\ &\quad 2.4768 \end{aligned}$$

$$\begin{aligned} \text{Max pitch diameter} &= \text{min pitch diameter} + \\ &\quad \text{tolerance (table 3.7)} \\ &= 2.4768 + 0.0073 = \\ &\quad 2.4841 \end{aligned}$$

$$\begin{aligned} \text{Min minor diameter} &= \text{basic major diameter} - \\ &\quad 1.25H \text{ (table 2.1)} \\ &= 2.500 - 0.0387 = 2.461 \end{aligned}$$

$$\begin{aligned} \text{Max minor diameter} &= \text{min minor diameter} + \\ &\quad \text{tolerance (table 3.9)} \\ &= 2.4613 + 0.0063 = 2.468. \end{aligned}$$

★

The dimensions of the above internal thread may be stated on the drawing as follows:

Major diameter: 2.5000 min

Pitch diameter: 2.4768 + 0.0073
- 0.0000

Minor diameter: 2.461 + 0.0063
- 0.0000.

★

External thread, 2.500-28UNS-2A (To mate with the above thread)

$$\begin{aligned}\text{Max major diameter} &= \text{basic major diameter} - \\&\quad \text{allowance (table 3.2)} \\&= 2.5000 - 0.0014 = 2.4986\end{aligned}$$

$$\begin{aligned}\text{Min major diameter} &= \text{max major diameter} - \\&\quad \text{tolerance (tabulated on} \\&\quad \text{p. 3.04)} \\&= 2.4986 - 0.0065 = 2.4921\end{aligned}$$

$$\begin{aligned}\text{Max pitch diameter} &= \text{max major diameter} - \\&\quad 0.75H \text{ (table 2.1)} \\&= 2.4986 - 0.0232 = 2.4754\end{aligned}$$

$$\begin{aligned}\text{Min pitch diameter} &= \text{max pitch diameter} - \text{tolerance (table 3.4)} \\&= 2.4754 - 0.0049 = 2.4705\end{aligned}$$

$$\begin{aligned}\text{Nom minor diameter} &= \text{max major diameter} - \\&\quad 17H/12 (1.4167H) \text{ (table} \\&\quad 2.1) \\&= 2.4986 - 0.0438 = 2.4548.\end{aligned}$$

The dimensions of the above external thread may

be stated on the drawing as follows:

$$\begin{aligned}\text{Major diameter: } &2.4986 + 0.0000 \\&- 0.0065\end{aligned}$$

$$\begin{aligned}\text{Pitch diameter: } &2.4754 + 0.0000 \\&- 0.0049\end{aligned}$$

$$\text{Minor diameter: } 2.4548, \text{ nominal.}$$

The design of a special thread usually requires that consideration be given to various factors in order that the thread assembly will function properly. These factors are discussed in appendix A5. It is to be noted particularly that deviations from the preferred tolerances for major diameter of the external thread and for minor diameter of the internal thread may be necessary in order to arrive at the optimum design.

12. GAGES

The specifications for gages, including marking, as presented in section 6 apply also to gages for special threads.

TABLE 3.1. Selected combinations, Unified special screw threads, UNS

Nominal size and threads per inch	External										Internal							
	Class	Allowance	Major diameter		Pitch diameter			Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter			
			Max ^a	Min	Max ^b	Min	Tolerance			Min	Max	Min	Max	Tolerance				
1	2A	.00010	.1890	.1825	.1858	.1825	.0033	.1452	2B	.181	.180	.1888	.1711	.0043	.1900			
.100-28	2A	.0008	.1801	.1838	.1711	.1681	.0030	.1580	2B	.160	.165	.1720	.1750	.0039	.1900			
.100-36	2A	.0009	.1691	.1640	.1720	.1700	.0029	.1584	2B	.163	.169	.1738	.1775	.0037	.1900			
.100-40	2A	.0008	.1692	.1647	.1737	.1731	.0028	.1636	2B	.167	.172	.1765	.1799	.0034	.1900			
.100-56	2A	.0007	.1693	.1652	.1777	.1752	.0025	.1671	2B	.171	.175	.1784	.1816	.0033	.1900			
.216-36	2A	.0009	.2181	.2096	.1971	.1941	.0030	.1810	2B	.186	.192	.1980	.2019	.0039	.2160			
.216-40	2A	.0009	.2181	.2100	.1989	.1960	.0029	.1844	2B	.189	.195	.1998	.2035	.0037	.2160			
.216-48	2A	.0008	.2182	.2107	.2017	.1991	.0026	.1896	2B	.193	.198	.2025	.2059	.0034	.2160			
.216-56	2A	.0007	.2153	.2112	.2037	.2012	.0023	.1934	2B	.197	.201	.2044	.2076	.0032	.2160			
.250-24	2A	.0011	.2489	.2417	.2218	.2181	.0037	.1978	2B	.205	.215	.2220	.2277	.0048	.2500			
.250-27	2A	.0010	.2490	.2423	.2249	.2214	.0035	.2038	2B	.210	.219	.2250	.2304	.0045	.2500			
.250-36	2A	.0009	.2491	.2436	.2311	.2280	.0031	.2150	2B	.220	.226	.2320	.2380	.0040	.2500			
.250-40	2A	.0009	.2491	.2440	.2320	.2300	.0029	.2184	2B	.223	.229	.2338	.2378	.0038	.2500			
.250-48	2A	.0008	.2492	.2447	.2317	.2330	.0027	.2236	2B	.227	.232	.2385	.2401	.0036	.2500			
.250-56	2A	.0008	.2492	.2481	.2378	.2350	.0026	.2273	2B	.231	.235	.2384	.2417	.0033	.2500			
.3125-27	2A	.0010	.3119	.3048	.2874	.2839	.0035	.2661	2B	.272	.281	.2934	.3029	.0045	.3125			
.3125-34	2A	.0009	.3116	.3061	.2938	.2906	.0031	.2775	2B	.282	.290	.2945	.2985	.0040	.3125			
.3125-40	2A	.0009	.3116	.3065	.2954	.2925	.0029	.2809	2B	.285	.291	.2963	.3001	.0038	.3125			
.3125-48	2A	.0008	.3117	.3079	.2982	.2953	.0027	.2881	2B	.290	.298	.2990	.3028	.0036	.3125			
.375-18	2A	.0013	.3737	.3660	.3376	.3333	.0013	.3058	2B	.318	.328	.3389	.3445	.0036	.3750			
.375-27	2A	.0011	.3739	.3671	.3498	.3462	.0030	.3285	2B	.335	.344	.3505	.3556	.0047	.3750			
.375-36	2A	.0010	.3740	.3683	.3560	.3528	.0032	.3399	2B	.343	.352	.3570	.3612	.0042	.3750			
.375-40	2A	.0009	.3741	.3690	.3579	.3548	.0031	.3434	2B	.348	.354	.3588	.3628	.0040	.3750			
.390-27	2A	.0011	.3889	.3822	.3648	.3613	.0038	.3435	2B	.380	.389	.3869	.3706	.0047	.3900			
.4375-18	2A	.0013	.4362	.4275	.4001	.3958	.0043	.3680	2B	.377	.390	.4014	.4070	.0056	.4375			
.4375-24	2A	.0011	.4364	.4292	.4093	.4056	.0038	.3853	2B	.392	.402	.4104	.4153	.0049	.4375			
.4375-27	2A	.0011	.4364	.4297	.4123	.4087	.0038	.3910	2B	.397	.406	.4134	.4181	.0047	.4375			
.4375-28	2A	.0011	.4365	.4310	.4155	.4183	.0032	.4024	2B	.407	.414	.4185	.4237	.0042	.4375			
.4375-40	2A	.0009	.4388	.4318	.4021	.3973	.0033	.4059	2B	.410	.418	.4213	.4253	.0040	.4375			
.500-12	2A	.0018	.4984	.4870	.4443	.4389	.0054	.3982	2B	.410	.428	.4489	.4529	.0070	.5000			
.500-14	2A	.0000	.5000	.4886	.4489	.4119	.0040	.3978	2B	.4100	.4223	.4459	.4511	.0052	.5000			
.500-18	2A	.0015	.4985	.4882	.4521	.4471	.0050	.4109	2B	.423	.438	.4538	.4601	.0065	.5000			
.500-24	2A	.0012	.4988	.4918	.4717	.4678	.0039	.4477	2B	.433	.465	.4729	.4780	.0051	.5000			
.500-27	2A	.0011	.4989	.4922	.4748	.4711	.0037	.4535	2B	.440	.469	.4739	.4807	.0048	.5000			
.500-30	2A	.0010	.4990	.4933	.4810	.4777	.0033	.4610	2B	.470	.476	.4830	.4863	.0042	.5000			
.500-40	2A	.0010	.4990	.4839	.4828	.4796	.0032	.4883	2B	.473	.479	.4838	.4879	.0041	.5000			
.5625-14	2A	.0018	.5610	.5507	.5146	.5096	.0050	.4734	2B	.485	.501	.5161	.5228	.0068	.5625			
.5625-27	2A	.0011	.5614	.5347	.5373	.5336	.0037	.5160	2B	.522	.531	.5384	.5422	.0048	.5625			
.5625-38	2A	.0010	.5615	.5560	.5435	.5402	.0033	.5274	2B	.532	.539	.5415	.5488	.0043	.5625			
.5625-40	2A	.0010	.5615	.5561	.5464	.5421	.0032	.5308	2B	.535	.541	.5463	.5504	.0041	.5625			
.625-14	2A	.0015	.6235	.6132	.5771	.5720	.0051	.5350	2B	.548	.564	.5786	.5853	.0068	.6250			

See footnotes at end of table.



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TABLE 3.1. Selected combinations, Unified special screw threads, UNS—Continued

Nominal size and threads per inch	External ^a										Internal ^b							
	Class	Allowance	Major diameter		Pitch diameter			6 ^c Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter			
			Max ^d	Min	Max ^e	Min	Tolerance			Min	Max	Min	Max	Tolerance				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
.050-07	2A	in .0011	.0500	.0473	.0500	.0490	.0038	.0788	1B	.053	.054	.0600	.0600	.0060	in .0250			
.050-08	2A	.0010	.0540	.0516	.0560	.0536	.0034	.0800	1B	.056	.057	.0670	.0670	.0070	.0114	.0044	.0250	
.050-09	2A	.0010	.0540	.0518	.0573	.0548	.0033	.0803	1B	.058	.064	.0688	.0688	.0048			.0250	
.750-14	2A	.0018	.7498	.7383	.7021	.6970	.0051	.6600	1B	.673	.683	.7036	.7103	.0067	.7500			
.750-15	2A	.0014	.7498	.7398	.7125	.7079	.0048	.6804	1B	.690	.703	.7129	.7199	.0080	.7500			
.750-16	2A	.0012	.7498	.7416	.7217	.7176	.0041	.6977	1B	.705	.715	.7220	.7233	.0043	.7500			
.750-17	2A	.0012	.7498	.7421	.7247	.7303	.0039	.7034	1B	.710	.719	.7250	.7310	.0051	.7500			
.750-18	2A	.0010	.7490	.7428	.7310	.7278	.0035	.7148	1B	.720	.728	.7320	.7365	.0048	.7500			
.750-19	2A	.0010	.7490	.7429	.7328	.7294	.0034	.7183	1B	.723	.729	.7338	.7383	.0044	.7500			
.075-10	2A	.0018	.0753	.0803	.0823	.0823	.0060	.7804	1B	.767	.788	.8100	.8178	.0078	.8750			
.075-18	2A	.0014	.0726	.0849	.0878	.0836	.0046	.8054	2B	.818	.828	.8339	.8449	.0080	.8750			
.075-24	2A	.0012	.0734	.0856	.0857	.0828	.0041	.8227	2B	.830	.840	.8479	.8523	.0043	.8750			
.075-27	2A	.0012	.0738	.0871	.0857	.0858	.0039	.8334	2B	.835	.844	.8300	.8380	.0081	.8750			
.075-35	2A	.0010	.0760	.0838	.0860	.0838	.0035	.8399	2B	.848	.853	.8570	.8618	.0045	.8750			
.075-40	2A	.0010	.0740	.0838	.0878	.0846	.0034	.8433	2B	.848	.854	.8588	.8623	.0044	.8750			
1.050-10	2A	.0018	.9863	.9863	.9323	.9270	.0063	.8758	1B	.982	.913	.9320	.9420	.0080	1.0000			
1.000-14 ^d	1A	.0017	.9863	.9833	.9819	.9426	.0084	.9107	1B	.923	.933	.9628	.9648	.0109	1.0000			
	2A	.0017	.9863	.9830	.9819	.9463	.0086	.9107	2B	.923	.933	.9638	.9609	.0073	1.0000			
	3A	.0000	1.0000	.9867	.9838	.9494	.0043	.9124	2B	.920	.938	.9636	.9660	.0054	1.0000			
1.000-18	2A	.0014	.9866	.9866	.9436	.9578	.0047	.9304	2B	.940	.953	.9629	.9701	.0063	1.0000			
1.000-24	2A	.0018	.9867	.9818	.9716	.9674	.0043	.9478	2B	.956	.966	.9729	.9784	.0046	1.0000			
1.000-27	2A	.0012	.9868	.9821	.9747	.9707	.0040	.9534	2B	.960	.968	.9758	.9811	.0033	1.0000			
1.000-36	2A	.0011	.9869	.9834	.9800	.9773	.0038	.9648	2B	.970	.978	.9830	.9867	.0047	1.0000			
1.000-40	2A	.0010	.9860	.9839	.9838	.9793	.0035	.9682	2B	.973	.979	.9833	.9833	.0045	1.0000			
1.125-10	2A	.0018	1.1223	1.1103	1.0882	1.0830	.0063	1.0005	1B	1.017	1.033	1.0600	1.0680	.0080	1.1250			
1.125-14	2A	.0016	1.1224	1.1131	1.0770	1.0717	.0063	1.0285	2B	1.048	1.064	1.0786	1.0865	.0069	1.1250			
1.125-24	2A	.0018	1.1227	1.1166	1.0988	1.0926	.0043	1.0726	2B	1.080	1.090	1.0797	1.1034	.0046	1.1250			
1.250-10	2A	.0019	1.2481	1.2383	1.1831	1.1788	.0063	1.1284	2B	1.143	1.163	1.1820	1.1933	.0083	1.2500			
1.250-14	2A	.0016	1.2484	1.2381	1.2020	1.1966	.0064	1.1908	2B	1.173	1.183	1.2030	1.2106	.0070	1.2500			
1.250-24	2A	.0013	1.2487	1.2415	1.2216	1.2173	.0043	1.1978	2B	1.208	1.218	1.2279	1.2388	.0064	1.2500			
1.275-10	2A	.0019	1.2771	1.2803	1.2081	1.2018	.0063	1.2604	2B	1.267	1.288	1.3100	1.3183	.0083	1.2750			
1.275-14	2A	.0018	1.2774	1.2821	1.2370	1.2318	.0064	1.2853	2B	1.298	1.314	1.2336	1.2384	.0070	1.2750			
1.275-24	2A	.0013	1.2777	1.2868	1.2446	1.2423	.0043	1.3336	2B	1.330	1.340	1.3479	1.3538	.0054	1.2750			
1.000-10	2A	.0019	1.0001	1.0533	1.0331	1.0307	.0064	1.0784	2B	1.032	1.043	1.0350	1.0423	.0063	1.0000			
1.000-14	2A	.0017	1.0003	1.0330	1.0510	1.0464	.0066	1.1007	2B	1.043	1.053	1.0538	1.0608	.0073	1.0000			
1.000-24	2A	.0018	1.0007	1.0415	1.0716	1.0679	.0044	1.1478	2B	1.055	1.065	1.0730	1.0787	.0044	1.0000			
1.025-10	2A	.0019	1.0321	1.0103	1.0541	1.0517	.0064	1.0004	2B	1.017	1.023	1.0500	1.0623	.0063	1.0250			
1.025-14	2A	.0017	1.0323	1.0130	1.0700	1.0714	.0068	1.0327	2B	1.048	1.064	1.0786	1.0865	.0069	1.0250			
1.025-24	2A	.0018	1.0327	1.0168	1.0590	1.0523	.0044	1.0736	2B	1.080	1.090	1.0879	1.0937	.0068	1.0250			
1.250-10	2A	.0019	1.2481	1.2383	1.0631	1.0706	.0065	1.0284	2B	1.043	1.053	1.0350	1.0324	.0064	1.2500			
1.250-14	2A	.0017	1.2483	1.2380	1.0703	1.0663	.0066	1.0807	2B	1.073	1.083	1.0738	1.0709	.0073	1.2500			

See footnotes at end of table.

TABLE 3.1. Selected combinations, Unified special screw threads, UNS—Continued

Nominal size and threads per inch	External ^a									Internal ^b								
	Class	Allowance	Major diameter		Pitch diameter			(e) Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter			
			Max ^b	Min	Max ^b	Min	Tolerance			Min	Max	Min	Max	Tolerance				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
1.750-18	2A	.0018	1.7485	1.7388	1.7184	1.7079	.0051	1.6803	2B	1.690	1.703	1.7120	1.7205	.0064	1.7300			
1.875-10	2A	.0019	1.8731	1.8602	1.8081	1.8015	.0068	1.7804	2B	1.787	1.798	1.8100	1.8184	.0084	1.8750			
1.875-14	2A	.0017	1.8733	1.8630	1.8269	1.8213	.0056	1.7857	2B	1.798	1.814	1.8258	1.8389	.0073	1.8750			
1.875-18	2A	.0015	1.8733	1.8648	1.8374	1.8323	.0051	1.8083	2B	1.815	1.828	1.8386	1.8455	.0068	1.8750			
3.000-10	2A	.0020	3.0082	3.0057	2.9330	2.9235	.0043	2.8733	2B	2.892	2.913	2.9350	2.9433	.0053	3.0000			
3.000-14	2A	.0017	3.0083	3.0080	2.9519	2.9462	.0057	2.9107	2B	2.923	2.938	2.9534	2.9610	.0074	3.0000			
3.000-18	2A	.0015	3.0083	3.0088	2.9624	2.9573	.0051	2.9303	2B	2.940	2.963	2.9639	2.9704	.0067	3.0000			
3.0625-16	2A	.0018	3.0609	3.0515	2.9203	2.9149	.0051	2.8942	2B	2.903	2.909	2.9219	2.9239	.0070	3.0625			
3.0625-18	2A	.0020	3.0625	3.0531	2.9219	2.9179	.0040	2.8958	2B	2.900	2.903	2.9219	2.9271	.0063	3.0625			
3.1250-16	2A	.0018	3.1250	3.1176	2.9453	2.9300	.0054	2.9102	2B	2.920	2.934	2.9460	2.9530	.0070	3.1250			
3.1250-18	2A	.0020	3.1250	3.1175	2.9781	2.9459	.0041	2.9108	2B	2.920	2.930	2.9453	2.9521	.0063	3.1250			
3.250-10	2A	.0020	3.2480	3.2351	2.9830	2.9768	.0063	2.9253	2B	2.942	2.963	2.9850	2.9935	.0088	3.2500			
3.300-14	2A	.0017	3.3183	3.3080	2.9219	2.9162	.0057	2.8807	2B	2.913	2.930	2.9328	2.9410	.0074	3.2500			
3.300-18	2A	.0015	3.3183	3.3098	2.9124	2.9073	.0051	2.8903	2B	2.910	2.923	2.9182	2.9206	.0067	3.2500			
3.3125-16	2A	.0017	3.3108	3.3014	2.9703	2.9547	.0058	2.9241	2B	2.948	2.950	2.9718	2.9791	.0073	3.3125			
3.3125-18	2A	.0020	3.3125	3.3021	2.9719	2.9578	.0041	2.9258	2B	2.9450	2.9533	2.9719	2.9773	.0064	3.3125			
3.4375-16	2A	.0017	3.4355	3.4264	2.9963	2.9897	.0046	2.9591	2B	2.970	2.977	2.9960	2.9941	.0072	3.4375			
3.4375-18	2A	.0020	3.4375	3.4281	2.9700	2.9623	.0041	2.9608	2B	2.9700	2.9723	2.9900	2.9933	.0064	3.4375			
2.500-10	2A	.0020	2.4980	2.4831	2.4330	2.4283	.0057	2.3753	2B	2.392	2.413	2.4350	2.4427	.0087	2.5000			
2.500-14	2A	.0017	2.4983	2.4830	2.4519	2.4461	.0058	2.4107	2B	2.423	2.438	2.4535	2.4612	.0078	2.5000			
2.500-18	2A	.0015	2.4984	2.4897	2.4623	2.4570	.0053	2.4302	2B	2.440	2.453	2.4638	2.4700	.0069	2.5000			
2.750-10	2A	.0020	2.7480	2.7381	2.6830	2.6763	.0067	2.6258	2B	2.642	2.663	2.6850	2.6937	.0087	2.7500			
2.750-14	2A	.0017	2.7482	2.7380	2.7019	2.6961	.0058	2.6607	2B	2.673	2.688	2.7026	2.7112	.0078	2.7500			
2.750-18	2A	.0015	2.7484	2.7384	2.7037	2.6923	.0053	2.6803	2B	2.690	2.703	2.7120	2.7206	.0089	2.7500			
3.000-10	2A	.0020	3.0080	2.9881	2.9330	2.9262	.0068	2.8783	2B	2.882	2.913	2.9350	2.9420	.0088	3.0000			
3.000-14	2A	.0018	3.0082	2.9879	2.9318	2.9180	.0059	2.9106	2B	2.923	2.938	2.9538	2.9618	.0077	3.0000			
3.000-18	2A	.0016	3.0084	2.9897	2.9623	2.9549	.0054	2.9302	2B	2.940	2.953	2.9638	2.9708	.0070	3.0000			
3.250-10	2A	.0020	3.2480	3.2351	2.9830	2.9762	.0068	2.9123	2B	3.142	3.163	3.1850	3.1938	.0088	3.2500			
3.250-14	2A	.0018	3.2482	3.2370	2.9218	2.9159	.0058	2.9106	2B	3.173	3.188	3.2036	3.2113	.0077	3.2500			
3.250-18	2A	.0016	3.2484	3.2397	2.9123	2.9069	.0054	2.9102	2B	3.180	3.193	3.2120	3.2206	.0076	3.2500			
3.500-10	2A	.0021	3.4979	3.4830	3.4339	3.4260	.0069	3.3783	2B	3.382	3.413	3.4330	3.4400	.0080	3.5000			
3.500-14	2A	.0018	3.4982	3.4879	3.4518	3.4457	.0061	3.4106	2B	3.423	3.438	3.4536	3.4618	.0078	3.5000			
3.500-18	2A	.0017	3.4983	3.4882	3.4632	3.4587	.0055	3.4301	2B	3.440	3.463	3.4639	3.4711	.0073	3.5000			
3.750-10	2A	.0021	3.7479	3.7350	3.6820	3.6760	.0069	3.6233	2B	3.642	3.663	3.6850	3.6940	.0080	3.7500			
3.750-14	2A	.0018	3.7483	3.7379	3.7018	3.6957	.0061	3.6808	2B	3.673	3.688	3.7026	3.7115	.0079	3.7500			
3.750-18	2A	.0017	3.7483	3.7398	3.7132	3.7067	.0058	3.6804	2B	3.690	3.703	3.7120	3.7211	.0073	3.7500			
4.000-10	2A	.0021	3.9979	3.9850	3.9339	3.9250	.0070	3.8782	2B	3.882	3.913	3.9350	3.9441	.0081	4.0000			
4.000-14	2A	.0018	3.9983	3.9879	3.9518	3.9456	.0063	3.8106	2B	3.923	3.938	3.9538	3.9618	.0080	4.0000			
4.250-10	2A	.0021	4.2479	4.2280	4.1820	4.1759	.0070	4.1233	2B	4.142	4.153	4.1880	4.1941	.0081	4.2500			
4.250-14	2A	.0018	4.2482	4.2379	4.3018	4.1964	.0063	4.1608	2B	4.173	4.188	4.2034	4.2116	.0080	4.2500			
4.500-10	2A	.0021	4.4979	4.4850	4.4229	4.4250	.0070	4.3782	2B	4.392	4.413	4.4380	4.4441	.0081	4.5000			

See footnotes at end of table.

TABLE 3.1. Selected combinations, Unified special screw threads, UNS—Continued

Nominal size and threads per inch	External ^a										Internal ^b						
	Class	Allowance	Major diameter		Pitch diameter			(c) Minor diameter	Class	Minor diameter		Pitch diameter			Major diameter		
			Max ^c	Min	Max ^d	Min	Tolerance			Min	Max	Min	Max	Tolerance			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
4.500-14	2A	.0018	4.4983	4.4870	4.4818	4.4486	.0063	4.4106	2B	4.423	4.438	4.4835	4.4816	.0080	in	4.8000	
4.750-10	2A	.0022	4.7478	4.7349	4.6828	4.6736	.0073	4.6281	2B	4.642	4.643	4.6850	4.6844	.0084	in	4.7500	
4.750-14	2A	.0019	4.7481	4.7378	4.7017	4.6963	.0064	4.6605	2B	4.673	4.683	4.7038	4.7118	.0083	in	4.7500	
5.000-10	2A	.0022	4.9978	4.9849	4.9328	4.9256	.0073	4.8781	2B	4.892	4.913	4.9350	4.9464	.0084	in	5.0000	
5.000-14	2A	.0019	4.9981	4.9878	4.9517	4.9153	.0064	4.9105	2B	4.923	4.928	4.9628	4.9619	.0083	in	5.0000	
5.250-10	2A	.0022	5.2478	5.2349	5.1828	5.1756	.0073	5.1251	2B	5.142	5.183	5.1850	5.1844	.0084	in	5.2500	
5.250-14	2A	.0019	5.2481	5.2378	5.2017	5.1653	.0064	5.1605	2B	5.173	5.182	5.2038	5.2110	.0083	in	5.2500	
5.500-10	2A	.0022	5.4078	5.4849	5.4328	5.4256	.0073	5.3751	2B	5.392	5.413	5.4230	5.4444	.0084	in	5.5000	
5.500-14	2A	.0019	5.4981	5.4878	5.4517	5.4483	.0064	5.4105	2B	5.423	5.438	5.4538	5.4619	.0083	in	5.5000	
5.750-10	2A	.0022	5.7478	5.7349	5.6828	5.6736	.0073	5.6251	2B	5.642	5.643	5.6850	5.6916	.0084	in	5.7500	
5.750-14	2A	.0020	5.7480	5.7377	5.7016	5.6901	.0063	5.6604	2B	5.673	5.683	5.7028	5.7191	.0085	in	5.7500	
6.000-10	2A	.0022	5.9978	5.9849	5.9328	5.9256	.0073	5.8781	2B	5.892	5.913	5.9350	5.9446	.0084	in	6.0000	
6.000-14	2A	.0020	5.9980	5.9877	5.9516	5.9481	.0065	5.9104	2B	5.923	5.938	5.9538	5.9621	.0085	in	6.0000	

* Regarding combinations of thread classes, see under Thread classes in section 2.

^b For class 1A threads having an additive finish the maximum is increased to the basic size. See under Classes 1A and 2B threads, and Coated threads in section 2.

^c See figures 2.3, 2.4, and 2.5.

^d The 1.000-14 size was formerly NF. The tolerances and allowances for this size are based on one diameter length of engagement.

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TABLE 3.2 Allowances for external threads of special diameters and pitches, classes 1A and 2A*
(UNI threads. See par. 10, p. 2.03.)

Allowance based on diameter of --	0.0435	0.0375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1	1.125	1.5
For diameter range Above --	0.0470	0.0781	0.1084	0.1843	0.2168	0.3125	0.4375	0.5625	0.6875	0.875	1.125	1.375
To and including --	0.0781	0.1084	0.1843	0.2168	0.2168	0.4375	0.5625	0.6875	0.875	1.125	1.375	1.625
Threads per inch												
	Major, pitch, and minor diameter allowances											
80	in	in	in	in	in	in	in	in	in	in	in	in
72	.0006	.0006	.0006	.0007	.0007	.0007	.0007	.0008	.0008	.0010	.0010	.0010
64	.0006	.0006	.0006	.0007	.0007	.0007	.0007	.0008	.0008	.0010	.0010	.0010
56	.0007	.0007	.0007	.0007	.0008	.0008	.0008	.0009	.0009	.0011	.0011	.0011
48	.0007	.0007	.0008	.0008	.0008	.0008	.0009	.0009	.0009	.0011	.0012	.0012
44	.0008	.0008	.0008	.0008	.0008	.0008	.0009	.0009	.0009	.0010	.0010	.0010
40				.0008	.0008	.0008	.0010	.0010	.0010	.0010	.0011	.0011
32				.0008	.0008	.0008	.0010	.0010	.0010	.0010	.0011	.0011
24				.0009	.0009	.0009	.0011	.0011	.0011	.0011	.0012	.0012
20				.0010	.0010	.0011	.0011	.0011	.0011	.0013	.0013	.0013
18				.0010	.0010	.0011	.0011	.0011	.0011	.0013	.0013	.0013
16				.0011	.0011	.0011	.0013	.0013	.0013	.0013	.0013	.0013
14												
12												
10												
8												
6												
4												
Allowance based on diameter of --	1.75	2	2.5	3	3.5	4	5	6	8	10	12	
For diameter range Above --	1.026	1.075	1.225	1.75	2.25	2.75	3.75	4.5	5.5	7	8	11
To and including --	1.075	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	12	
Threads per inch												
	Major, pitch, and minor diameter allowances											
80	in	in	in	in	in	in	in	in	in	in	in	in
72												
64												
56												
48												
44												
40												
32	0.0013	0.0013	0.0013	0.0013	0.0014	0.0014	0.0015	0.0016	0.0016	0.0017	0.0017	
24	.0013	.0013	.0014	.0014	.0014	.0014	.0015	.0015	.0016	.0016	.0017	
20	.0013	.0013	.0014	.0014	.0014	.0014	.0015	.0015	.0016	.0016	.0017	
18	.0014	.0014	.0014	.0014	.0015	.0015	.0015	.0016	.0016	.0017	.0017	
16	.0015	.0015	.0016	.0016	.0016	.0017	.0017	.0018	.0018	.0019	.0019	
14	.0016	.0016	.0017	.0017	.0017	.0017	.0018	.0018	.0019	.0020	.0020	
12	.0017	.0017	.0017	.0018	.0018	.0018	.0018	.0019	.0019	.0020	.0021	
10	.0018	.0018	.0019	.0019	.0019	.0019	.0020	.0020	.0020	.0021	.0022	
8	.0019	.0019	.0020	.0020	.0020	.0020	.0021	.0021	.0022	.0022	.0024	
6	.0021	.0022	.0023	.0023	.0023	.0023	.0024	.0024	.0025	.0025	.0026	
4	.0023	.0023	.0026	.0026	.0026	.0026	.0026	.0027	.0027	.0028	.0029	

* Class 1A allowances are tabulated on p. 2.03.

CLASSES 1A, 2A ALLOWANCES

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TABLE 3.3. Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, classes 1A and 1AR
(UNI threads. See par. 7.3, p. 2.03; par. 10, p. 3.05.)

Tolerance based on diameter of --		<i>t</i>	0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range Above --			0.0470	0.0781	0.1094	0.1562	0.2125	0.3125	0.4375	0.5425	0.6875	0.875
To and including --			0.0781	0.1094	0.1563	0.2125	0.3125	0.4375	0.5425	0.6875	0.875	1.125
Threads per inch	Length of engagement											Pitch diameter tolerances
	Number of pitches	Inches										
80	8 to 15 16 to 30	0.06 to 0.10 0.19 to 0.33		in	in	in	in	in	in	in	in	in
72	8 to 15 16 to 30	0.07 to 0.21 0.211 to 0.43										
64	8 to 15 16 to 30	0.08 to 0.22 0.231 to 0.45										
56	8 to 15 16 to 30	0.09 to 0.27 0.271 to 0.54										
48	8 to 15 16 to 30	0.10 to 0.31 0.311 to 0.62										
44	8 to 15 16 to 30	0.11 to 0.34 0.341 to 0.68	0.0038 .0048	0.0039 .0049	0.0041 .0051	0.0043 .0053	0.0044 .0054	0.0048 .0058	0.0047 .0057	0.0049 .0059	0.0051 .0061	0.0053
40	8 to 15 16 to 30	0.12 to 0.38 0.381 to 0.78		.0041 .0051	.0043 .0053	.0044 .0054	.0046 .0056	.0048 .0058	.0049 .0059	.0050 .0060	.0051 .0061	.0053
38	8 to 15 16 to 30	0.14 to 0.42 0.421 to 0.84			.0043 .0054	.0045 .0056	.0046 .0056	.0048 .0058	.0050 .0060	.0051 .0061	.0053 .0063	.0054
32	8 to 15 16 to 30	0.16 to 0.47 0.471 to 0.94				.0045 .0057	.0047 .0059	.0048 .0061	.0050 .0063	.0052 .0065	.0053 .0063	.0057
30	8 to 15 16 to 30	0.18 to 0.54 0.541 to 1.08					.0048 .0063	.0050 .0064	.0053 .0067	.0055 .0069	.0056 .0070	.0058 .0073
27	8 to 15 16 to 30	0.19 to 0.58 0.581 to 1.13						.0051 .0064	.0053 .0066	.0054 .0068	.0055 .0070	.0056 .0072
24	8 to 15 16 to 30	0.21 to 0.62 0.621 to 1.24						.0054 .0067	.0056 .0069	.0057 .0071	.0059 .0073	.0061 .0077
20	8 to 15 16 to 30	0.25 to 0.75 0.751 to 1.50						.0060 .0075	.0062 .0077	.0063 .0079	.0065 .0081	.0066 .0083
18	8 to 15 16 to 30	0.28 to 0.82 0.821 to 1.66							.0064 .0081	.0067 .0083	.0068 .0085	.0069 .0086
16	8 to 15 16 to 30	0.31 to 0.94 0.941 to 1.88							.0068 .0085	.0070 .0088	.0072 .0090	.0073 .0091
14	8 to 15 16 to 30	0.36 to 1.07 1.071 to 2.14								.0075 .0093	.0076 .0094	.0077 .0097
12	8 to 15 16 to 30	0.42 to 1.23 1.231 to 2.50								.0080 .0100	.0082 .0102	.0083 .0104
10	8 to 15 16 to 30	0.50 to 1.40 1.401 to 3.00									.0090 .0113	.0093 .0118
8	8 to 15 16 to 30	0.62 to 1.88 1.881 to 3.78										.0103 .0128
6	8 to 15 16 to 30	0.83 to 2.60 2.601 to 5.00										
4	8 to 15 16 to 30	1.25 to 3.75 3.751 to 7.50										

1A, 1AR P.D. TOLERANCES

TABLE 3.3. Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, classes 1A and 1AR—Con.

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13

Pitch diameter tolerances

Threads per task

LEGENDS

- These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and 4UN thread series in Table 2.21.
 - Classes 1A and 1AR tolerances in this table for 5 to 18 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places (see Table 2.19) by a factor of 1.5.
 - Classes 1A and 1AR tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places (see Table 2.19) by a factor of 1.478 (obtained by multiplying the 1.5 factor by 1.23). For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
 - Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
 - Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Division of Special Threads in appendix A5.

in	in	in	in	in	in	in	in	in	in	in	in	in	in	in
.0058 .0070	.0058 .0072													
.0058 .0073	.0060 .0078	.0061 .0077	.0062 .0078	.0065 .0081	.0067 .0083									
.0061 .0077	.0063 .0079	.0064 .0080	.0066 .0082	.0068 .0083	.0070 .0085	.0071 .0087	.0073 .0089	.0073 .0091						
.0061 .0078	.0061 .0080	.0065 .0081	.0066 .0083	.0066 .0086	.0070 .0088	.0072 .0090	.0074 .0092	.0076 .0096	.0079 .0096	.0082 .0099				
.0065 .0081	.0067 .0083	.0068 .0083	.0069 .0086	.0071 .0089	.0073 .0092	.0075 .0094	.0077 .0096	.0079 .0099	.0082 .0102					
.0070 .0087	.0071 .0089	.0073 .0091	.0074 .0092	.0076 .0093	.0078 .0098	.0080 .0100	.0081 .0102	.0084 .0103	.0087 .0109	.0090 .0112	.0094 .0117			
.0073 .0091	.0074 .0093	.0076 .0093	.0077 .0096	.0079 .0099	.0081 .0101	.0083 .0104	.0084 .0104	.0087 .0109	.0090 .0113	.0094 .0116	.0097 .0122	.0101 .0128		
.0077 .0098	.0076 .0098	.0079 .0099	.0081 .0101	.0083 .0104	.0085 .0106	.0086 .0108	.0088 .0110	.0091 .0113	.0093 .0116	.0098 .0122	.0102 .0127	.0105 .0132	.0108 .0138	
.0081 .0101	.0083 .0103	.0084 .0103	.0085 .0106	.0087 .0109	.0089 .0113	.0091 .0114	.0092 .0116	.0093 .0119	.0098 .0122	.0102 .0128	.0105 .0134	.0108 .0142	.0112 .0143	
.0087 .0106	.0088 .0110	.0090 .0112	.0091 .0113	.0093 .0116	.0095 .0119	.0097 .0121	.0098 .0123	.0101 .0126	.0103 .0129	.0107 .0134	.0111 .0141	.0114 .0142	.0116 .0143	
.0094 .0115	.0096 .0119	.0097 .0121	.0098 .0123	.0100 .0125	.0102 .0128	.0104 .0130	.0105 .0132	.0108 .0133	.0111 .0138	.0115 .0144	.0118 .0148	.0121 .0152	.0124 .0153	
.0104 .0130	.0106 .0132	.0107 .0124	.0108 .0126	.0111 .0128	.0113 .0141	.0114 .0143	.0116 .0145	.0119 .0148	.0121 .0151	.0125 .0158	.0129 .0161	.0132 .0163	.0134 .0165	
	.0121 .0132	.0122 .0134	.0124 .0135	.0126 .0159	.0128 .0160	.0130 .0162	.0131 .0164	.0134 .0168	.0137 .0171	.0141 .0178	.0144 .0180	.0147 .0184		
	.0132 .0153	.0134 .0154		.0154 .0159	.0155 .0161	.0157 .0164	.0158 .0168	.0162 .0202	.0164 .0203	.0168 .0210	.0172 .0214	.0175 .0218		
				.0161 .0169	.0162 .0162	.0164 .0166	.0166 .0168							

1A. IAR P.D. TOLERANCES

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TABLE 3.4 Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, class 8A
(UNB threads. See par. 7.3, p. 3.03; par. 10, p. 3.04.)

Tolerance based on diameter of --		0.0625	0.09375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1	
For diameter range Above --		0.0770	0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	
To and including --		0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125	
Threads per inch	Length of engagement										Pitch diameter tolerances	
	Number of pitches	Inches										
80	{ 8 to 15 16 to 30	0.06 to 0.19 0.191 to 0.38	in 0.0019 .0024	in 0.0020 .0025	in 0.0021 .0026	in 0.0022 .0027	in 0.0023 .0028	in 0.0024 .0029	in 0.0025 .0031	in 0.0027 .0034	in 0.0029 .0035	in 0.0030 .0037
72	{ 8 to 15 16 to 30	0.07 to 0.21 0.211 to 0.42	in 0.0020 .0023	in 0.0021 .0026	in 0.0022 .0027	in 0.0023 .0028	in 0.0024 .0029	in 0.0025 .0031	in 0.0027 .0034	in 0.0029 .0036	in 0.0030 .0038	in 0.0031 .0039
64	{ 8 to 15 16 to 30	0.08 to 0.23 0.231 to 0.46	in 0.0021 .0026	in 0.0022 .0027	in 0.0022 .0028	in 0.0023 .0029	in 0.0024 .0031	in 0.0025 .0032	in 0.0026 .0034	in 0.0027 .0035	in 0.0029 .0036	in 0.0030 .0037
56	{ 8 to 15 16 to 30	0.09 to 0.27 0.271 to 0.54	in 0.0022 .0029	in 0.0023 .0030	in 0.0024 .0031	in 0.0025 .0032	in 0.0026 .0031	in 0.0027 .0033	in 0.0028 .0034	in 0.0029 .0035	in 0.0030 .0036	in 0.0030 .0037
48	{ 8 to 15 16 to 30	0.10 to 0.31 0.311 to 0.62	in 0.0023 .0031	in 0.0025 .0033	in 0.0026 .0033	in 0.0027 .0034	in 0.0028 .0034	in 0.0029 .0035	in 0.0030 .0037	in 0.0031 .0038	in 0.0031 .0039	in 0.0031 .0039
44	{ 8 to 15 16 to 20	0.11 to 0.34 0.341 to 0.68	in 0.0025 .0032	in 0.0026 .0033	in 0.0027 .0034	in 0.0028 .0035	in 0.0029 .0037	in 0.0030 .0038	in 0.0031 .0039	in 0.0032 .0040	in 0.0032 .0041	in 0.0034 .0042
40	{ 8 to 15 16 to 20	0.12 to 0.38 0.381 to 0.76	in 0.0027 .0034	in 0.0028 .0035	in 0.0029 .0036	in 0.0030 .0037	in 0.0031 .0038	in 0.0032 .0039	in 0.0033 .0040	in 0.0033 .0041	in 0.0034 .0042	in 0.0035 .0044
36	{ 8 to 15 16 to 30	0.14 to 0.42 0.431 to 0.84	in 0.0029 .0038	in 0.0030 .0037	in 0.0030 .0038	in 0.0031 .0039	in 0.0032 .0040	in 0.0033 .0041	in 0.0033 .0043	in 0.0034 .0043	in 0.0035 .0044	in 0.0036 .0045
32	{ 8 to 15 16 to 30	0.16 to 0.47 0.471 to 0.94	in 0.0030 .0038	in 0.0031 .0039	in 0.0032 .0040	in 0.0033 .0042	in 0.0034 .0043	in 0.0035 .0044	in 0.0036 .0045	in 0.0036 .0046	in 0.0036 .0047	in 0.0036 .0047
28	{ 8 to 15 16 to 30	0.18 to 0.54 0.541 to 1.08	in 0.0033 .0042	in 0.0034 .0043	in 0.0034 .0044	in 0.0035 .0045	in 0.0036 .0046	in 0.0037 .0047	in 0.0038 .0048	in 0.0038 .0047	in 0.0038 .0048	in 0.0039 .0050
27	{ 8 to 15 16 to 30	0.19 to 0.56 0.561 to 1.13	in 0.0034 .0043	in 0.0035 .0043	in 0.0035 .0044	in 0.0036 .0045	in 0.0036 .0045	in 0.0037 .0047	in 0.0038 .0048	in 0.0038 .0049	in 0.0038 .0050	in 0.0039 .0050
24	{ 8 to 15 16 to 30	0.21 to 0.62 0.621 to 1.34	in 0.0036 .0048	in 0.0038 .0048	in 0.0038 .0048	in 0.0039 .0049	in 0.0039 .0049	in 0.0040 .0050	in 0.0040 .0051	in 0.0040 .0051	in 0.0041 .0052	in 0.0042 .0053
20	{ 8 to 15 16 to 30	0.25 to 0.75 0.751 to 1.50	in 0.0038 .0050	in 0.0040 .0050	in 0.0040 .0050	in 0.0041 .0051	in 0.0041 .0051	in 0.0042 .0052	in 0.0043 .0053	in 0.0043 .0054	in 0.0044 .0055	in 0.0045 .0056
18	{ 8 to 15 16 to 30	0.28 to 0.82 0.821 to 1.68	in 0.0040 .0052	in 0.0042 .0054	in 0.0043 .0054	in 0.0044 .0055	in 0.0044 .0055	in 0.0045 .0056	in 0.0045 .0057	in 0.0045 .0058	in 0.0046 .0058	in 0.0047 .0059
16	{ 8 to 15 16 to 30	0.31 to 0.94 0.941 to 1.88	in 0.0042 .0054	in 0.0044 .0056	in 0.0045 .0056	in 0.0046 .0057	in 0.0046 .0057	in 0.0047 .0058	in 0.0047 .0058	in 0.0048 .0058	in 0.0048 .0059	in 0.0049 .0060
14	{ 8 to 15 16 to 30	0.36 to 1.07 1.071 to 3.14	in 0.0044 .0057	in 0.0046 .0058	in 0.0047 .0059	in 0.0048 .0060	in 0.0049 .0061	in 0.0050 .0062	in 0.0051 .0063	in 0.0051 .0064	in 0.0051 .0065	in 0.0052 .0066
12	{ 8 to 15 16 to 30	0.43 to 1.25 1.251 to 3.50	in 0.0046 .0059	in 0.0048 .0060	in 0.0049 .0061	in 0.0050 .0062	in 0.0051 .0063	in 0.0052 .0064	in 0.0053 .0065	in 0.0054 .0066	in 0.0055 .0067	in 0.0057 .0071
10	{ 8 to 15 16 to 30	0.50 to 1.50 1.501 to 3.00	in 0.0048 .0060	in 0.0050 .0062	in 0.0051 .0063	in 0.0052 .0064	in 0.0053 .0065	in 0.0054 .0066	in 0.0055 .0067	in 0.0056 .0068	in 0.0057 .0069	in 0.0060 .0072
8	{ 8 to 15 16 to 30	0.62 to 1.62 1.621 to 3.76	in 0.0050 .0062	in 0.0052 .0064	in 0.0053 .0065	in 0.0054 .0066	in 0.0055 .0067	in 0.0056 .0068	in 0.0057 .0069	in 0.0058 .0070	in 0.0059 .0071	in 0.0065 .0068
6	{ 8 to 15 16 to 30	0.83 to 2.50 2.501 to 8.00	in 0.0052 .0064	in 0.0054 .0066	in 0.0055 .0067	in 0.0056 .0068	in 0.0057 .0069	in 0.0058 .0070	in 0.0059 .0071	in 0.0060 .0072	in 0.0061 .0073	in 0.0066 .0069
4	{ 8 to 15 16 to 30	1.23 to 8.78 2.751 to 7.80	in 0.0054 .0066	in 0.0056 .0068	in 0.0057 .0069	in 0.0058 .0070	in 0.0059 .0071	in 0.0060 .0072	in 0.0061 .0073	in 0.0062 .0074	in 0.0063 .0075	in 0.0066 .0069

2A P.D. TOLERANCES

TABLE 3.4. Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, class 2A—Con

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12	
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13	
Pitch diameter tolerances													
													Threads per inch

LEGENDS

- These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and SUN thread series in table 2.21.
- Formula:

$$\text{Class 2A tolerance} = 0.0018\sqrt{D} + 0.0018\sqrt{l_e} + 0.018\sqrt{p}$$
 where
 D = basic major diameter
 l_e = length of engagement
 p = pitch
- Length of engagement increments included in the tabulated tolerances for lengths of engagement of from 8 to 15 pitches are based on lengths of 9 pitches; those for lengths of engagement greater than 15 to 20 pitches are obtained by multiplying the 9-pitch values (taken to six decimal places (see table 2.10) by 1.25. For lengths of engagement not tabulated, the formula in legend 2 should be applied except as modified by par. 7.3, p. 3-03.
- Pitches listed are those most commonly and are recommended. When intermediate pitches are specified, the formula in legend 2 should be applied.
- Tolerances are tabulated only for combinations of diameter, pitch and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix AB.

in	in	in	in	in	in	in	in	in	in	in	in	in	in	in
0.0037	0.0038													40
.0047	.0048													36
.0039	.0040	0.0041	0.0043	0.0043	0.0044									32
.0049	.0060	.0061	.0063	.0064	.0065									28
.0041	.0042	.0043	.0044	.0045	.0046	0.0048	0.0048	0.0049						24
.0061	.0062	.0064	.0066	.0066	.0068	.0068	.0069	.0061						20
.0041	.0043	.0043	.0044	.0046	.0047	.0048	.0049	.0051	0.0051	0.0053				16
.0043	.0053	.0054	.0056	.0057	.0059	.0060	.0061	.0064	.0064	.0066				12
.0043	.0044	.0045	.0046	.0048	.0049	.0050	.0051	.0053	.0054					8
.0054	.0055	.0057	.0062	.0063	.0065	.0066	.0067	.0068	.0068					4
.0047	.0048	.0048	.0049	.0051	.0052	.0053	.0054	.0056	.0058					30
.0058	.0059	.0061	.0062	.0063	.0065	.0066	.0068	.0070	.0072					26
.0049	.0050	.0051	.0051	.0053	.0054	.0056	.0058	.0060	.0062	0.0063				18
.0061	.0062	.0063	.0064	.0066	.0068	.0069	.0070	.0072	.0073	.0075				14
.0061	.0062	.0063	.0064	.0065	.0066	.0068	.0069	.0071	.0072	.0073	.0074	.0075	.0076	10
.0064	.0065	.0066	.0067	.0068	.0069	.0071	.0072	.0073	.0074	.0075	.0076	.0077	.0078	6
.0066	.0068	.0070	.0071	.0072	.0073	.0074	.0075	.0077	.0078	.0081	.0083	.0085	.0086	4
.0068	.0069	.0071	.0072	.0073	.0074	.0075	.0076	.0077	.0078	.0081	.0083	.0085	.0086	3
.0072	.0073	.0073	.0074	.0076	.0077	.0079	.0080	.0082	.0084	.0086	.0089	.0090	.0092	2
.0063	.0064	.0065	.0066	.0067	.0068	.0069	.0070	.0072	.0074	.0077	.0079	.0081	.0082	10
.0078	.0080	.0081	.0082	.0084	.0084	.0085	.0087	.0088	.0090	.0092	.0096	.0098	.0101	8
.0070	.0071	.0071	.0072	.0074	.0074	.0075	.0076	.0077	.0078	.0081	.0083	.0086	.0088	6
.0067	.0068	.0069	.0070	.0072	.0073	.0074	.0075	.0076	.0077	.0101	.0104	.0107	.0110	4
.0081	.0082	.0083	.0084	.0084	.0085	.0087	.0088	.0089	.0091	.0094	.0096	.0098	.0100	9
.0101	.0103	.0103	.0103	.0103	.0107	.0108	.0110	.0112	.0114	.0117	.0120	.0122	.0124	5
.0101	.0101	.0102	.0104	.0105	.0106	.0108	.0109	.0112	.0114	.0117	.0120	.0122	.0124	4
.0101	.0102	.0102	.0103	.0103	.0103	.0104	.0105	.0106	.0108	.0112	.0114	.0116	.0118	3

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TABLE 3.5 Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, class 3.4
(UNS threads. See par. 7.2, p. 3.03; par. 10, p. 3.05.)

Tolerance based on diameter of --			0.0635	0.06375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1
For diameter range			0.0470	0.0781	0.1094	0.1863	0.2153	0.3125	0.4375	0.5625	0.6875	0.875
Above --												
To and including --			0.0781	0.1094	0.1563	0.2153	0.3125	0.4375	0.5625	0.6875	0.875	1.125
Threads per inch	Length of engagement:		Pitch diameter tolerances									
	Number of pitches	Inches	in	in	in	in	in	in	in	in	in	in
80	5 to 15	0.05 to 0.19	.0014	.0018	.0018	.0018	.0017	.0017	.0010	.0020	.0022	.0022
	16 to 30	0.191 to 0.38	.0018	.0019	.0019	.0020	.0021	.0021	.0023	.0023	.0023	.0023
72	5 to 15	0.07 to 0.21	.0015	.0018	.0018	.0017	.0018	.0018	.0010	.0020	.0022	.0022
	16 to 30	0.211 to 0.42	.0019	.0019	.0020	.0021	.0021	.0021	.0023	.0023	.0023	.0023
64	5 to 15	0.08 to 0.23	.0016	.0018	.0017	.0018	.0018	.0019	.0020	.0020	.0022	.0022
	16 to 30	0.231 to 0.48	.0020	.0020	.0021	.0022	.0022	.0023	.0024	.0024	.0024	.0024
56	5 to 15	0.09 to 0.37	.0017	.0018	.0019	.0019	.0020	.0020	.0021	.0022	.0022	.0022
	16 to 30	0.371 to 0.84	.0022	.0022	.0023	.0023	.0024	.0024	.0025	.0027	.0028	.0028
48	5 to 15	0.10 to 0.31	.0019	.0019	.0020	.0020	.0020	.0023	.0023	.0023	.0024	.0024
	16 to 30	0.311 to 0.63	.0023	.0024	.0025	.0025	.0026	.0027	.0028	.0029	.0030	.0030
44	5 to 15	0.11 to 0.34	.0019	.0020	.0021	.0021	.0021	.0022	.0023	.0023	.0024	.0024
	16 to 30	0.341 to 0.68	.0024	.0024	.0025	.0025	.0026	.0026	.0029	.0030	.0030	.0032
40	5 to 15	0.13 to 0.38	.0021	.0021	.0022	.0022	.0023	.0023	.0024	.0025	.0025	.0026
	16 to 30	0.381 to 0.78	.0026	.0027	.0028	.0028	.0029	.0029	.0030	.0031	.0031	.0033
36	5 to 15	0.14 to 0.43	.0022	.0022	.0023	.0023	.0024	.0024	.0025	.0026	.0026	.0027
	16 to 30	0.431 to 0.84	.0027	.0027	.0028	.0028	.0029	.0029	.0031	.0032	.0033	.0034
32	5 to 15	0.16 to 0.47	.0023	.0024	.0024	.0024	.0025	.0025	.0026	.0027	.0027	.0028
	16 to 30	0.471 to 0.94	.0028	.0028	.0029	.0030	.0032	.0033	.0033	.0034	.0034	.0035
28	5 to 15	0.18 to 0.51	.0023	.0024	.0025	.0025	.0026	.0026	.0027	.0028	.0029	.0030
	16 to 30	0.541 to 1.08	.0031	.0031	.0032	.0032	.0033	.0034	.0034	.0035	.0036	.0037
24	5 to 15	0.19 to 0.56	.0025	.0026	.0027	.0027	.0028	.0028	.0029	.0030	.0030	.0030
	16 to 30	0.561 to 1.13	.0033	.0033	.0034	.0034	.0035	.0035	.0036	.0037	.0038	.0038
20	5 to 15	0.21 to 0.63	.0027	.0028	.0029	.0029	.0030	.0030	.0030	.0030	.0031	.0032
	16 to 30	0.631 to 1.24	.0034	.0034	.0034	.0034	.0035	.0035	.0036	.0036	.0038	.0040
18	5 to 15	0.25 to 0.75	.0030	.0031	.0031	.0031	.0031	.0031	.0033	.0041	.0041	.0043
	16 to 30	0.761 to 1.50	.0037	.0037	.0039	.0039	.0040	.0041	.0041	.0041	.0041	.0043
16	5 to 15	0.28 to 0.83	.0032	.0033	.0033	.0033	.0033	.0033	.0034	.0043	.0043	.0044
	16 to 30	0.831 to 1.66	.0041	.0041	.0042	.0042	.0043	.0043	.0043	.0043	.0043	.0044
14	5 to 15	0.35 to 1.07	.0037	.0038	.0038	.0038	.0038	.0038	.0039	.0048	.0048	.0050
	16 to 30	1.071 to 3.14	.0047	.0047	.0048	.0048	.0048	.0048	.0048	.0048	.0048	.0050
12	5 to 15	0.42 to 1.25	.0040	.0041	.0042	.0042	.0043	.0043	.0044	.0050	.0051	.0052
	16 to 30	1.251 to 3.50	.0050	.0050	.0051	.0051	.0052	.0052	.0053	.0053	.0053	.0053
10	5 to 15	0.50 to 1.50	.0045	.0046	.0047	.0047	.0048	.0048	.0049	.0056	.0057	.0058
	16 to 30	1.501 to 3.00	.0056	.0056	.0057	.0057	.0058	.0058	.0059	.0059	.0059	.0059
8	5 to 15	0.63 to 1.53	.0050	.0051	.0052	.0052	.0053	.0053	.0054	.0061	.0061	.0061
	16 to 30	1.531 to 3.76	.0061	.0061	.0062	.0062	.0063	.0063	.0064	.0064	.0064	.0064
6	5 to 15	0.63 to 1.50	.0050	.0051	.0052	.0052	.0053	.0053	.0054	.0060	.0061	.0061
	16 to 30	1.501 to 3.00	.0061	.0061	.0062	.0062	.0063	.0063	.0064	.0064	.0064	.0064
4	5 to 15	1.25 to 3.75	.0050	.0051	.0052	.0052	.0053	.0053	.0054	.0061	.0061	.0061
	16 to 30	3.731 to 7.50	.0061	.0061	.0062	.0062	.0063	.0063	.0064	.0064	.0064	.0064

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TABLE 3.5 Pitch diameter tolerances for external threads of special diameters, pitches, and lengths of engagement, class 3A—Con

.1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13

Pitch diameter tolerance

Threads per inch

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and 8UN thread series in table 2.31.
2. Class 3A tolerances in this table for 8 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 3A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 0.75. (See table 2.19.)
3. Class 3A tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 3A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 0.6375 (obtained by multiplying the 0.75 factor by 1.25.) (See table 2.19.) For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A8.

in	in	in	in	in	in	in	in	in	in	in	in	in
0.0025	0.0029	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.0038	.0034	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.0020	.0030	.0031	.0031	.0032	.0032	.....	.....	.....	.....	.....	.....	.....
.0037	.0038	.0038	.0039	.0040	.0042	.....	.....	.....	.....	.....	.....	.....
.0031	.0031	.0023	.0023	.0034	.0035	.0036	.0036	.....	.....	.....	.....	.....
.0038	.0039	.0040	.0041	.0042	.0044	.0045	.0046	.....	.....	.....	.....	.....
.0031	.0033	.0033	.0033	.0034	.0035	.0036	.0037	.0038	.0039	.....	.....	.....
.0038	.0040	.0041	.0041	.0042	.0044	.0045	.0046	.0048	.0049	.....	.....	.....
.0033	.0033	.0034	.0035	.0036	.0037	.0037	.0038	.0040	.0041	.....	.....	.....
.0041	.0043	.0043	.0043	.0045	.0046	.0047	.0048	.0050	.0051	.....	.....	.....
.0035	.0036	.0038	.0037	.0038	.0039	.0040	.0041	.0043	.0043	.....	.....	.....
.0044	.0045	.0045	.0046	.0046	.0049	.0050	.0051	.0053	.0054	.....	.....	.....
.0038	.0037	.0038	.0039	.0040	.0041	.0041	.0042	.0044	.0045	.0046	.0047	.....
.0045	.0047	.0047	.0048	.0050	.0051	.0052	.0053	.0054	.0055	.0056	.0057	.....
.0038	.0037	.0038	.0039	.0040	.0041	.0041	.0042	.0044	.0045	.0046	.0047	.....
.0048	.0049	.0049	.0050	.0050	.0052	.0053	.0054	.0055	.0056	.0057	.0058	.....
.0041	.0041	.0042	.0043	.0044	.0045	.0045	.0046	.0048	.0049	.0050	.0051	.....
.0048	.0049	.0049	.0050	.0050	.0052	.0053	.0054	.0055	.0056	.0057	.0058	.....
.0041	.0041	.0042	.0043	.0044	.0045	.0045	.0046	.0048	.0049	.0050	.0051	.....
.0048	.0049	.0049	.0050	.0050	.0052	.0053	.0054	.0055	.0056	.0057	.0058	.....
.0043	.0044	.0045	.0045	.0046	.0047	.0048	.0049	.0050	.0052	.0054	.0056	.0057
.0044	.0045	.0046	.0046	.0048	.0049	.0050	.0051	.0053	.0055	.0057	.0059	.0071
.0047	.0048	.0048	.0049	.0050	.0051	.0052	.0053	.0054	.0055	.0056	.0057	.0058
.0048	.0049	.0049	.0050	.0050	.0052	.0053	.0054	.0055	.0056	.0057	.0058	.0059
.0052	.0053	.0054	.0054	.0055	.0055	.0057	.0055	.0058	.0061	.0063	.0064	.0065
.0065	.0066	.0067	.0068	.0068	.0070	.0071	.0073	.0074	.0076	.0078	.0080	.0082
.0061	.0061	.0062	.0063	.0064	.0065	.0066	.0067	.0068	.0070	.0072	.0074	.0076
.0078	.0077	.0078	.0079	.0080	.0081	.0083	.0084	.0085	.0086	.0087	.0088	.0089
		.0078	.0077	.0078	.0079	.0079	.0079	.0081	.0082	.0084	.0085	.0087
		.0098	.0096	.0097	.0098	.0098	.0099	.0101	.0102	.0103	.0107	.0109

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TABLE 3.6. Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 1B—Con

1.25	1.5	1.75	2	2.5	3	3.5	4	5	6	8	10	12
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11
1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13

Pitch diameter tolerances

Threads
per inch

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNP, and SUN thread series in table 2.31.
2. Class 1B (internal thread) tolerances in this table for 3 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.85. (See table 2.10.)
3. Class 1B tolerances in this table for 16 to 30 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 2.4375 (obtained by multiplying the 1.85 factor by 1.25.) (See table 2.10.) For lengths of engagement not tabulated, see par. 7.3, p. 3.03.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.3, p. 3.03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A8.

| in | in | in | in | in | in | in | in | in | in | in | in | in |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0.0073 | 0.0075 | | | | | | | | | | | |
| .0091 | .0094 | | | | | | | | | | | |
| .0078 | .0078 | 0.0080 | 0.0081 | 0.0084 | 0.0087 | | | | | | | |
| .0095 | .0098 | .0100 | .0102 | .0105 | .0108 | | | | | | | |
| .0080 | .0082 | .0084 | .0085 | .0088 | .0090 | 0.0093 | 0.0095 | | | | | |
| .0100 | .0102 | .0104 | .0106 | .0110 | .0113 | .0116 | .0118 | | | | | |
| .0090 | .0083 | .0085 | .0085 | .0088 | .0092 | .0094 | .0096 | 0.0099 | 0.0103 | | | |
| .0101 | .0104 | .0106 | .0108 | .0111 | .0114 | .0117 | .0120 | .0124 | .0128 | | | |
| .0085 | .0087 | .0088 | .0088 | .0089 | .0093 | .0095 | .0097 | .0100 | .0103 | .0106 | | |
| .0105 | .0109 | .0110 | .0112 | .0118 | .0121 | .0124 | .0128 | .0130 | .0133 | | | |
| .0091 | .0093 | .0095 | .0096 | .0099 | .0101 | .0104 | .0106 | .0109 | .0112 | | | |
| .0114 | .0118 | .0118 | .0120 | .0124 | .0127 | .0130 | .0133 | .0137 | .0141 | | | |
| .0095 | .0097 | .0099 | .0100 | .0103 | .0105 | .0108 | .0110 | .0113 | .0116 | 0.0122 | | |
| .0118 | .0121 | .0123 | .0125 | .0129 | .0132 | .0135 | .0137 | .0142 | .0146 | .0152 | | |
| .0100 | .0101 | .0103 | .0105 | .0108 | .0110 | .0112 | .0114 | .0118 | .0121 | .0126 | 0.0131 | |
| .0124 | .0127 | .0129 | .0131 | .0135 | .0138 | .0140 | .0143 | .0148 | .0151 | .0156 | .0164 | |
| .0105 | .0107 | .0109 | .0111 | .0114 | .0116 | .0118 | .0120 | .0124 | .0127 | .0132 | .0137 | 0.0141 |
| .0132 | .0134 | .0136 | .0138 | .0142 | .0145 | .0148 | .0150 | .0155 | .0159 | .0165 | .0171 | .0176 |
| .0113 | .0118 | .0118 | .0120 | .0121 | .0123 | .0126 | .0128 | .0131 | .0134 | .0140 | .0144 | .0148 |
| .0141 | .0143 | .0145 | .0147 | .0151 | .0154 | .0157 | .0159 | .0164 | .0168 | .0175 | .0180 | .0185 |
| .0122 | .0124 | .0126 | .0128 | .0130 | .0133 | .0135 | .0137 | .0141 | .0144 | .0149 | .0154 | .0158 |
| .0163 | .0168 | .0168 | .0169 | .0169 | .0169 | .0169 | .0173 | .0176 | .0180 | .0187 | .0192 | .0197 |
| .0138 | .0138 | .0139 | .0141 | .0144 | .0146 | .0148 | .0151 | .0154 | .0157 | .0163 | .0167 | .0171 |
| .0170 | .0172 | .0174 | .0176 | .0180 | .0183 | .0185 | .0188 | .0193 | .0197 | .0203 | .0209 | .0214 |
| .0158 | .0160 | .0161 | .0164 | .0167 | .0169 | .0171 | .0174 | .0178 | .0183 | .0187 | .0191 | .0195 |
| .0197 | .0200 | .0202 | .0204 | .0206 | .0208 | .0211 | .0214 | .0218 | .0222 | .0226 | .0231 | .0236 |
| | | | .0197 | .0200 | .0202 | .0204 | .0206 | .0210 | .0213 | .0216 | .0222 | .0227 |
| | | | | .0246 | .0250 | .0253 | .0255 | .0258 | .0262 | .0266 | .0270 | .0284 |

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TABLE 3.6. Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 1B
(UNS threads. See par. 7.3, p. 8-03; par. 10, p. 8-06.)

Tolerance based on diameter of --		0.0625	0.06275	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1	
For diameter range Above --		0.0170	0.0781	0.1094	0.1663	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	
To and including --		0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125	
Threads per inch	Length of engagement										Pitch diameter tolerances	
	Number of pitches	inches										
80	{ 8 to 15 16 to 30	0.06 to 0.19 0.191 to 0.38										
72	{ 8 to 15 16 to 30	0.07 to 0.21 0.211 to 0.43										
64	{ 8 to 15 16 to 20	0.08 to 0.23 0.231 to 0.46										
56	{ 8 to 15 16 to 30	0.09 to 0.27 0.271 to 0.64										
48	{ 8 to 15 16 to 30	0.10 to 0.31 0.311 to 0.63										
44	{ 8 to 15 16 to 30	0.11 to 0.34 0.341 to 0.68	0.0030 0.003	0.0031 0.004	0.0033 0.0067	0.0035 0.0089	0.0038 0.0073	0.0060 0.0074	0.0063 0.0077	0.0063 0.0079	0.0066 0.0082	
40	{ 8 to 15 16 to 30	0.12 to 0.38 0.381 to 0.76		0.0044 0.0067	0.0046 0.0070	0.0057 0.0073	0.0060 0.0078	0.0063 0.0078	0.0064 0.0080	0.0065 0.0083	0.0068 0.0088	
38	{ 8 to 15 16 to 30	0.14 to 0.42 0.421 to 0.84			0.0056 0.0070	0.0058 0.0073	0.0060 0.0078	0.0063 0.0081	0.0065 0.0083	0.0068 0.0086	0.0071 0.0083	
32	{ 8 to 15 16 to 30	0.18 to 0.47 0.471 to 0.94			0.0066 0.0074	0.0061 0.0077	0.0063 0.0079	0.0068 0.0082	0.0068 0.0083	0.0070 0.0087	0.0074 0.0092	
28	{ 8 to 15 16 to 30	0.18 to 0.64 0.541 to 1.08				0.0068 0.0081	0.0067 0.0083	0.0068 0.0087	0.0073 0.0092	0.0073 0.0094	0.0078 0.0097	
27	{ 8 to 15 16 to 30	0.19 to 0.68 0.561 to 1.13				0.0068 0.0083	0.0068 0.0085	0.0070 0.0088	0.0073 0.0091	0.0074 0.0093	0.0078 0.0098	
24	{ 8 to 15 16 to 30	0.21 to 0.62 0.621 to 1.24				0.0070 0.0087	0.0073 0.0089	0.0074 0.0093	0.0076 0.0093	0.0078 0.0098	0.0083 0.0103	
20	{ 8 to 15 16 to 30	0.25 to 0.75 0.751 to 1.50					0.0078 0.0097	0.0080 0.0101	0.0083 0.0103	0.0084 0.0106	0.0088 0.0107	0.0092 0.0111
18	{ 8 to 15 16 to 30	0.28 to 0.83 0.831 to 1.66						0.0084 0.0105	0.0087 0.0108	0.0089 0.0110	0.0090 0.0113	0.0093 0.0116
16	{ 8 to 15 16 to 30	0.31 to 0.91 0.941 to 1.88						0.0089 0.0111	0.0091 0.0114	0.0093 0.0116	0.0098 0.0118	0.0097 0.0122
14	{ 8 to 15 16 to 30	0.38 to 1.07 1.071 to 2.14							0.0097 0.0121	0.0099 0.0134	0.0100 0.0123	0.0103 0.0129
12	{ 8 to 15 16 to 30	0.42 to 1.25 1.251 to 2.50							0.0104 0.0130	0.0106 0.0133	0.0108 0.0135	0.0110 0.0138
10	{ 8 to 15 16 to 30	0.50 to 1.60 1.601 to 3.00								0.0117 0.0147	0.0120 0.0150	
8	{ 8 to 15 16 to 30	0.62 to 1.88 1.881 to 3.78									0.0133 0.0167	
6	{ 8 to 15 16 to 30	0.83 to 2.50 2.501 to 5.00										
4	{ 8 to 15 16 to 30	1.25 to 3.75 3.751 to 7.50										

1B P.D. TOLERANCES

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TABLE 3.7. Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 2B
(UNS threads. See par. 7.3, p. 3.03; par. 10, p. 3.03.)

Tolerance based on diameter of --		0.0625	0.06375	0.125	0.1875	0.35	0.375	0.5	0.625	0.75	1	
For diameter range Above --		0.0470	0.0781	0.1094	0.1562	0.3183	0.3235	0.4378	0.5625	0.6875	0.875	
To and including --		0.0781	0.1094	0.1562	0.2188	0.3125	0.4375	0.5625	0.6875	0.875	1.125	
Threads per inch	Length of engagement										Pitch diameter tolerances	
	Number of pitches	Inches									in	in
60	5 to 15	0.06 to 0.19										
	16 to 30	0.191 to 0.38	0.0025	0.0036	0.0027	0.0029	0.0029	0.0029	0.0032	0.0032		
72	5 to 15	0.07 to 0.21										
	16 to 30	0.211 to 0.42	0.0032	0.0034	0.0035	0.0037	0.0038	0.0040	0.0040	0.0040		
84	5 to 15	0.08 to 0.22										
	16 to 30	0.231 to 0.46	0.0034	0.0035	0.0037	0.0038	0.0040	0.0042	0.0044	0.0044		
96	5 to 15	0.09 to 0.27										
	16 to 30	0.271 to 0.54	0.0037	0.0039	0.0040	0.0042	0.0044	0.0046	0.0048	0.0049		
48	5 to 15	0.10 to 0.31										
	16 to 30	0.311 to 0.63	0.0033	0.0040	0.0041	0.0043	0.0044	0.0047	0.0048	0.0050	0.0051	
44	5 to 15	0.11 to 0.34										
	16 to 30	0.341 to 0.66	0.0033	0.0043	0.0044	0.0048	0.0049	0.0050	0.0051	0.0053	0.0055	0.0056
40	5 to 15	0.12 to 0.38										
	16 to 30	0.381 to 0.78	0.0038	0.0046	0.0048	0.0050	0.0053	0.0053	0.0053	0.0053	0.0056	0.0057
36	5 to 15	0.14 to 0.42										
	16 to 30	0.421 to 0.84	0.0037	0.0047	0.0049	0.0050	0.0052	0.0054	0.0055	0.0056	0.0057	0.0058
32	5 to 15	0.16 to 0.47										
	16 to 30	0.471 to 0.94	0.0030	0.0041	0.0042	0.0044	0.0045	0.0048	0.0048	0.0050	0.0051	0.0051
28	5 to 15	0.18 to 0.54										
	16 to 30	0.541 to 1.08	0.0034	0.0043	0.0044	0.0046	0.0048	0.0050	0.0050	0.0051	0.0053	0.0053
27	5 to 15	0.19 to 0.56										
	16 to 30	0.561 to 1.12	0.0036	0.0045	0.0047	0.0049	0.0050	0.0051	0.0052	0.0053	0.0053	0.0056
24	5 to 15	0.21 to 0.63										
	16 to 30	0.631 to 1.33	0.0038	0.0047	0.0048	0.0049	0.0051	0.0052	0.0053	0.0054	0.0055	0.0056
20	5 to 15	0.25 to 0.75										
	16 to 30	0.751 to 1.50	0.0033	0.0043	0.0044	0.0046	0.0047	0.0049	0.0051	0.0052	0.0053	0.0055
18	5 to 15	0.28 to 0.83										
	16 to 30	0.831 to 1.66	0.0032	0.0042	0.0043	0.0044	0.0046	0.0048	0.0049	0.0050	0.0052	0.0053
16	5 to 15	0.31 to 0.94										
	16 to 30	0.941 to 1.88	0.0034	0.0044	0.0045	0.0047	0.0048	0.0050	0.0051	0.0052	0.0053	0.0054
14	5 to 15	0.35 to 1.07										
	16 to 30	1.071 to 2.14	0.0036	0.0046	0.0047	0.0048	0.0049	0.0050	0.0051	0.0052	0.0053	0.0056
12	5 to 15	0.42 to 1.25										
	16 to 30	1.251 to 2.50	0.0038	0.0048	0.0049	0.0050	0.0051	0.0052	0.0053	0.0054	0.0055	0.0056
10	5 to 15	0.50 to 1.50										
	16 to 30	1.501 to 3.00	0.0036	0.0046	0.0047	0.0048	0.0049	0.0050	0.0051	0.0052	0.0053	0.0100
8	5 to 15	0.62 to 1.88										
	16 to 30	1.681 to 3.78	0.0038	0.0048	0.0049	0.0050	0.0051	0.0052	0.0053	0.0054	0.0055	0.0111
6	5 to 15	0.63 to 2.50										
	16 to 30	2.501 to 6.00	0.0036	0.0046	0.0047	0.0048	0.0049	0.0050	0.0051	0.0052	0.0053	0.0055
4	5 to 15	1.25 to 3.75										
	16 to 30	3.751 to 7.50	0.0038	0.0048	0.0049	0.0050	0.0051	0.0052	0.0053	0.0054	0.0055	

2B P.D. TOLERANCES

TABLE 3.7 Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class #B—Con.

1.25	1.6	1.75	3	3.5	3	3.5	4	5	6	8	10	12
1.125	1.375	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11
1.275	1.625	1.875	2.25	2.75	3.25	3.75	4.5	5.5	7	9	11	13

Pitch diameter tolerances

LEARNERS

- These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and $\frac{3}{16}$ UN thread series in table 2.21.
 - Class 1B (internal thread) tolerances in this table for 6 to 30 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerances for 6 pitches taken to six decimal places by a factor of 1.26. (See table 2.19.)
 - Class 2B tolerances in this table for 18 to 30 pitches are obtained by multiplying the class 1A (internal thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.625 (obtained by multiplying the 1.3 factor by 1.25). (See table 2.19.) For lengths of engagement not tabulated in table 2.21, p. 3.03, the formulas in part 7, 2.1, p. 1.03, should be applied.
 - Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formulas in part 7, 2.1, p. 1.03, should be applied.
 - Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A4.

in	in	in	in	in	in	in	in	in	in	in	in	in	in	in
0.0049	0.0050													46
.0081	.0082													48
.0081	.0082													49
.0083	.0085	0.0053	0.0054	0.0055	0.0058									50
.0087	.0088	0.0056	0.0058	0.0070	0.0072									52
.0083	.0088	0.0058	0.0057	0.0059	0.0060	0.0062	0.0063	0.0063	0.0064	0.0066	0.0068			53
.0087	.0088	0.0068	0.0070	0.0071	0.0073	0.0073	0.0077	0.0079						53
.0053	.0056	0.0056	0.0057	0.0059	0.0061	0.0063	0.0064	0.0066	0.0068	0.0068	0.0068			57
.0087	.0089	0.0069	0.0071	0.0073	0.0074	0.0076	0.0078	0.0080	0.0082	0.0082	0.0082			57
.0056	.0058	0.0059	0.0060	0.0062	0.0064	0.0065	0.0066	0.0068	0.0069	0.0071	0.0071			58
.0070	.0072	0.0074	0.0075	0.0077	0.0079	0.0081	0.0083	0.0085	0.0086	0.0086	0.0086			59
.0061	.0062	0.0063	0.0064	0.0065	0.0068	0.0069	0.0070	0.0073	0.0075	0.0075	0.0075			60
.0078	.0077	0.0079	0.0080	0.0083	0.0085	0.0086	0.0088	0.0091	0.0094	0.0094	0.0094			60
.0063	.0065	0.0066	0.0067	0.0069	0.0070	0.0073	0.0073	0.0078	0.0078	0.0081	0.0081			61
.0079	.0081	0.0082	0.0083	0.0085	0.0088	0.0090	0.0091	0.0094	0.0097	0.0101	0.0101			61
.0066	.0068	0.0069	0.0070	0.0073	0.0073	0.0075	0.0078	0.0079	0.0081	0.0084	0.0084	0.0087		62
.0083	.0085	0.0086	0.0087	0.0090	0.0092	0.0094	0.0095	0.0098	0.0101	0.0104	0.0104	0.0109		62
.0070	.0072	0.0073	0.0074	0.0076	0.0077	0.0079	0.0080	0.0083	0.0083	0.0085	0.0085		0.0091	63
.0088	.0089	0.0091	0.0092	0.0095	0.0097	0.0099	0.0100	0.0103	0.0105	0.0110	0.0114	0.0117		64
.0075	.0076	0.0078	0.0079	0.0081	0.0082	0.0084	0.0085	0.0087	0.0090	0.0093	0.0096	0.0096		65
.0094	.0096	0.0097	0.0098	0.0101	0.0103	0.0105	0.0106	0.0109	0.0113	0.0116	0.0130	0.0133		65
.0082	.0083	0.0084	0.0085	0.0087	0.0089	0.0090	0.0091	0.0094	0.0098	0.0100	0.0103	0.0108		66
.0102	.0104	0.0103	0.0108	0.0109	0.0111	0.0113	0.0114	0.0117	0.0120	0.0124	0.0128	0.0131		66
.0090	.0092	0.0093	0.0094	0.0096	0.0098	0.0099	0.0100	0.0103	0.0105	0.0108	0.0111	0.0114		67
.0118	.0118	0.0118	0.0128	0.0120	0.0122	0.0124	0.0125	0.0128	0.0131	0.0133	0.0139	0.0143		67
.0103	.0106	0.0108	0.0109	0.0111	0.0113	0.0114	0.0116	0.0118	0.0122	0.0125	0.0128	0.0130		68
.0133	.0133	0.0134	0.0137	0.0139	0.0141	0.0142	0.0143	0.0146	0.0148	0.0153	0.0156	0.0159		69
				0.0131	0.0133	0.0135	0.0138	0.0140	0.0142	0.0145	0.0148	0.0151		69
				0.0164	0.0166	0.0168	0.0170	0.0172	0.0178	0.0183	0.0186	0.0189		70

2B P.D. TOLERANCES

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TABLE 3.8 Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 3B
(UNS threads. See par. 7.3, p. 3-03; par. 10, p. 3-05.)

Tolerance based on diameter of --		0.0625	0.06375	0.125	0.1875	0.25	0.375	0.5	0.625	0.75	1	
For diameter range Above --		0.0470	0.0781	0.1094	0.1562	0.2158	0.3125	0.4375	0.5625	0.6875	0.875	
To and including --		0.0781	0.1094	0.1562	0.2158	0.3125	0.4375	0.5625	0.6875	0.875	1.125	
Threads per inch	Length of engagement										Pitch diameter tolerances	
	Number of pitches	Inches									in	in
50	5 to 15	0.08 to 0.19									in	in
	16 to 30	0.101 to 0.38	.0019	.0019	.0020	.0021	.0022	.0023	.0024	.0025		
			.0023	.0024	.0023	.0026	.0027					
72	5 to 15	0.07 to 0.21	.0019	.0020	.0021	.0022	.0023	.0024	.0025	.0026		
	16 to 30	0.211 to 0.42	.0024	.0025	.0026	.0027	.0028					
64	5 to 15	0.08 to 0.23	.0020	.0021	.0022	.0023	.0024	.0025	.0026	.0027		
	16 to 30	0.231 to 0.46	.0026	.0027	.0027	.0029	.0030	.0031	.0033			
56	5 to 15	0.09 to 0.27										
	16 to 30	0.271 to 0.54	.0023	.0023	.0024	.0025	.0026	.0026	.0027	.0028	.0029	
			.0028	.0029	.0130	.0031	.0032					
48	5 to 15	0.10 to 0.31										
	16 to 30	0.311 to 0.62	.0024	.0025	.0026	.0027	.0028	.0029	.0030	.0031	.0032	
			.0030	.0031	.0032	.0033	.0034					
44	5 to 15	0.11 to 0.34										
	16 to 30	0.341 to 0.68	.0025	.0026	.0027	.0028	.0029	.0030	.0031	.0032	.0033	
			.0031	.0032	.0033	.0034	.0035					
40	5 to 15	0.13 to 0.38										
	16 to 30	0.381 to 0.76	.0027	.0028	.0029	.0030	.0030	.0031	.0032	.0033	.0034	
			.0033	.0035	.0036	.0037	.0039					
36	5 to 15	0.14 to 0.42										
	16 to 30	0.421 to 0.84	.0028	.0029	.0030	.0030	.0031	.0032	.0033	.0034	.0035	
			.0038	.0039	.0040	.0041	.0042					
32	5 to 15	0.16 to 0.47										
	16 to 30	0.471 to 0.94	.0030	.0031	.0031	.0032	.0033	.0034	.0035	.0036	.0037	
			.0037	.0038	.0039	.0041	.0042					
28	5 to 15	0.18 to 0.54										
	16 to 30	0.541 to 1.06	.0033	.0033	.0034	.0035	.0035	.0036	.0037	.0038	.0039	
			.0041	.0042	.0043	.0045	.0046					
27	5 to 15	0.19 to 0.56										
	16 to 30	0.561 to 1.12	.0033	.0034	.0034	.0035	.0035	.0036	.0037	.0038	.0039	
			.0041	.0042	.0044	.0045	.0046					
24	5 to 15	0.21 to 0.63										
	16 to 30	0.621 to 1.24	.0035	.0036	.0036	.0037	.0038	.0038	.0039	.0040	.0041	
			.0044	.0045	.0046	.0046	.0048					
20	5 to 15	0.25 to 0.75										
	16 to 30	0.751 to 1.50	.0037	.0038	.0039	.0040	.0041	.0042	.0043	.0044	.0045	
			.0049	.0050	.0052	.0053	.0053					
18	5 to 15	0.28 to 0.83										
	16 to 30	0.831 to 1.66	.0042	.0043	.0044	.0045	.0046	.0047	.0048	.0049	.0050	
			.0053	.0054	.0055	.0056	.0056					
16	5 to 15	0.31 to 0.94										
	16 to 30	0.941 to 1.88	.0045	.0046	.0047	.0048	.0049	.0049	.0050	.0051	.0052	
			.0056	.0057	.0058	.0059	.0059					
14	5 to 15	0.35 to 1.07										
	16 to 30	1.071 to 2.14	.0048	.0049	.0050	.0051	.0052	.0053	.0053	.0054	.0055	
			.0061	.0062	.0063	.0064	.0064					
12	5 to 15	0.42 to 1.25										
	16 to 30	1.251 to 2.50	.0052	.0053	.0054	.0055	.0056	.0057	.0057	.0058	.0059	
			.0065	.0066	.0067	.0068	.0068					
10	5 to 15	0.50 to 1.60										
	16 to 30	1.601 to 3.00	.0055	.0056	.0057	.0058	.0059	.0060	.0061	.0062	.0063	
			.0073									
8	5 to 15	0.63 to 1.88										
	16 to 30	1.881 to 3.78	.0060	.0061	.0062	.0063	.0064	.0065	.0066	.0067	.0068	
			.0087									
6	5 to 15	0.83 to 2.50										
	16 to 30	2.501 to 5.00	.0065	.0066	.0067	.0068	.0069	.0070	.0071	.0072	.0073	
			.0089									
4	5 to 15	1.25 to 3.75										
	16 to 30	3.751 to 7.80	.0071	.0072	.0073	.0074	.0075	.0076	.0077	.0078	.0079	

3B P.D. TOLERANCES

TABLE 3.8 Pitch diameter tolerances for internal threads of special diameters, pitches, and lengths of engagement, class 3B—Con

1.25	1.5	1.75	2	2.25	3	3.5	4	5	6	8	10	12
1.125	1.275	1.625	1.875	2.25	3.25	3.75	3.25	3.75	4.5	5.5	7	9
1.875	1.625	1.875	2.25	2.75	3.25	3.75	4.25	5.5	7	8	11	12

Pitch diameter tolerances

Threads per inch

LEGENDS

1. These values do not agree with and shall not be used in place of any tabulated values for the UNC, UNF, and JIS thread series in table 2.21.
2. Class 3B (internal threads) tolerances in this table for 5 to 15 pitches are based on 9 pitches and are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 0.975. (See table 2.19.)
3. Class 3B tolerances in this table for 16 to 20 pitches are obtained by multiplying the class 2A (external thread) tolerances for 9 pitches taken to six decimal places by a factor of 1.31875 (obtained by multiplying the 0.975 factor by 1.35.) (See table 2.19.) For lengths of engagement not tabulated, see par. 7.2, p. 3-03.
4. Pitches listed are those used most commonly and are recommended. Where intermediate pitches are specified, the formula in par. 7.2, p. 3-03, should be applied.
5. Tolerances are tabulated only for combinations of diameter, pitch, and length of engagement which are considered to be generally used. For other combinations encountered, see Design of Special Threads in appendix A5.

in	in	in	in	in	in	in	in	in	in	in	in	in	in
0.0038	0.0037												
.0044	.0047												
.0033	.0038	0.0040	0.0041	0.0043	0.0043								
.0042	.0049	.0050	.0051	.0053	.0054								
.0040	.0041	.0043	.0043	.0044	.0045	0.0046	0.0047						
.0050	.0061	.0063	.0063	.0058	.0067	.0068							
.0043	.0041	.0043	.0043	.0045	.0046	.0047	.0048	0.0080	0.0081				
.0061	.0062	.0053	.0054	.0056	.0057	.0059	.0060	.0062	.0064				
.0043	.0043	.0044	.0045	.0046	.0048	.0049	.0050	.0060	.0063	.0063			
.0053	.0054	.0055	.0056	.0058	.0060	.0061	.0062	.0064	.0066				
.0043	.0046	.0047	.0048	.0050	.0051	.0053	.0053	.0056	.0058				
.0057	.0058	.0059	.0060	.0062	.0063	.0065	.0066	.0068	.0070				
.0047	.0048	.0049	.0050	.0051	.0053	.0054	.0055	.0057	.0058	.0061			
.0060	.0060	.0062	.0063	.0064	.0066	.0067	.0069	.0071	.0073	.0076			
.0050	.0051	.0053	.0053	.0054	.0055	.0056	.0057	.0058	.0061	.0063	.0066		
.0062	.0063	.0066	.0066	.0067	.0068	.0070	.0072	.0074	.0076	.0078	.0083		
.0053	.0054	.0056	.0055	.0057	.0058	.0058	.0060	.0063	.0063	.0066	.0068	.0070	
.0066	.0067	.0068	.0068	.0071	.0072	.0074	.0075	.0077	.0079	.0083	.0086	.0088	
.0066	.0067	.0058	.0059	.0060	.0062	.0063	.0064	.0066	.0067	.0070	.0073	.0074	
.0070	.0072	.0073	.0074	.0078	.0077	.0078	.0080	.0083	.0084	.0087	.0090	.0092	
.0061	.0062	.0063	.0064	.0065	.0066	.0068	.0069	.0070	.0072	.0073	.0077	.0079	
.0076	.0078	.0079	.0080	.0082	.0083	.0084	.0086	.0088	.0090	.0093	.0096	.0098	
.0068	.0069	.0070	.0071	.0073	.0073	.0074	.0075	.0077	.0079	.0081	.0084	.0086	
.0065	.0066	.0067	.0068	.0069	.0071	.0083	.0084	.0086	.0088	.0093	.0102	.0104	
.0079	.0080	.0081	.0082	.0083	.0084	.0085	.0087	.0089	.0091	.0091	.0094	.0096	
.0089	.0100	.0101	.0103	.0104	.0106	.0107	.0109	.0111	.0114	.0117	.0120		
			.0098	.0100	.0101	.0102	.0103	.0105	.0107	.0109	.0112	.0115	
			.0123	.0125	.0126	.0128	.0129	.0131	.0133	.0137	.0140	.0143	
													4

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TABLE 3.9. Minor diameter tolerances for internal special screw threads, classes 1B and 2B
(UNS threads, see par. 10, p. 3-06.)

Tolerance based on basic major diameter of --			0.060	0.073	0.086	0.099	0.112	0.125	0.138	0.154	0.190	0.216	All larger diameters						
For diameter range Above --			0.053	0.066	0.079	0.092	0.105	0.118	0.131	0.151	0.177	0.203							
To and including --			0.066	0.079	0.092	0.105	0.118	0.131	0.151	0.177	0.203	0.223							
1B, 2B Minor diameter tolerances 1B, 2B																			
Threads per inch	Tolerance ratios	Length of engagement in terms of diameter	Above	To and including															
80	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0038 0.0049 0.0051 0.0049	0.0029 0.0044 0.0049 0.0049	0.0023 0.0038 0.0043 0.0049	0.0022 0.0034 0.0038 0.0049	0.0020 0.0030 0.0037 0.0049	0.0018 0.0028 0.0031 0.0042	0.0015 0.0023 0.0031 0.0039	0.0015 0.0023 0.0031 0.0039	0.0015 0.0023 0.0031 0.0039	0.0015 0.0023 0.0031 0.0039							
72	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0039 0.0048 0.0051 0.0055	0.0029 0.0049 0.0053 0.0055	0.0023 0.0038 0.0043 0.0053	0.0026 0.0038 0.0051 0.0058	0.0023 0.0032 0.0043 0.0053	0.0017 0.0028 0.0034 0.0043	0.0017 0.0028 0.0034 0.0042	0.0017 0.0028 0.0034 0.0042	0.0017 0.0028 0.0034 0.0042	0.0017 0.0028 0.0034 0.0042							
64	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 2D	0.0045 0.0062 0.0062 0.0062	0.0038 0.0057 0.0062 0.0063	0.0033 0.0049 0.0059 0.0063	0.0029 0.0040 0.0053 0.0063	0.0027 0.0037 0.0049 0.0061	0.0024 0.0037 0.0049 0.0061	0.0023 0.0030 0.0040 0.0048	0.0020 0.0028 0.0038 0.0048	0.0019 0.0028 0.0038 0.0048	0.0019 0.0028 0.0038 0.0048							
56	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0044 0.0068 0.0070 0.0070	0.0038 0.0057 0.0060 0.0070	0.0034 0.0051 0.0060 0.0070	0.0031 0.0046 0.0057 0.0070	0.0029 0.0040 0.0053 0.0070	0.0026 0.0038 0.0047 0.0068	0.0023 0.0030 0.0040 0.0064	0.0022 0.0029 0.0039 0.0064	0.0022 0.0029 0.0039 0.0064	0.0022 0.0029 0.0039 0.0064							
48	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0048 0.0068 0.0070 0.0070	0.0040 0.0061 0.0064 0.0070	0.0037 0.0056 0.0061 0.0070	0.0034 0.0051 0.0063 0.0070	0.0032 0.0047 0.0053 0.0070	0.0028 0.0038 0.0043 0.0063	0.0025 0.0033 0.0043 0.0063	0.0025 0.0033 0.0043 0.0063	0.0025 0.0033 0.0043 0.0063	0.0025 0.0033 0.0043 0.0063							
44	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0073 0.0075 0.0075	0.0044 0.0067 0.0069 0.0070	0.0040 0.0061 0.0064 0.0070	0.0037 0.0056 0.0061 0.0070	0.0034 0.0051 0.0058 0.0068	0.0032 0.0043 0.0049 0.0068	0.0028 0.0038 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068							
40	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0049 0.0074 0.0076 0.0076	0.0048 0.0067 0.0069 0.0070	0.0041 0.0062 0.0064 0.0068	0.0039 0.0056 0.0058 0.0068	0.0034 0.0047 0.0051 0.0068	0.0032 0.0043 0.0047 0.0063	0.0028 0.0038 0.0043 0.0063	0.0025 0.0033 0.0043 0.0063	0.0025 0.0033 0.0043 0.0063	0.0025 0.0033 0.0043 0.0063							
36	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0075 0.0078 0.0078	0.0044 0.0067 0.0069 0.0070	0.0040 0.0062 0.0064 0.0068	0.0037 0.0055 0.0058 0.0068	0.0035 0.0048 0.0051 0.0068	0.0031 0.0043 0.0047 0.0068	0.0028 0.0038 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068							
32	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0075 0.0078 0.0078	0.0044 0.0067 0.0069 0.0070	0.0040 0.0062 0.0064 0.0068	0.0037 0.0055 0.0058 0.0068	0.0034 0.0047 0.0051 0.0068	0.0032 0.0043 0.0047 0.0068	0.0028 0.0038 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068							
28	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0075 0.0078 0.0078	0.0044 0.0067 0.0069 0.0070	0.0040 0.0062 0.0064 0.0068	0.0037 0.0055 0.0058 0.0068	0.0034 0.0047 0.0051 0.0068	0.0032 0.0043 0.0047 0.0068	0.0028 0.0038 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068							
27	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0075 0.0078 0.0078	0.0044 0.0067 0.0069 0.0070	0.0040 0.0062 0.0064 0.0068	0.0037 0.0055 0.0058 0.0068	0.0034 0.0047 0.0051 0.0068	0.0032 0.0043 0.0047 0.0068	0.0028 0.0038 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068							
24	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0.0050 0.0075 0.0078 0.0078	0.0044 0.0067 0.0069 0.0070	0.0040 0.0062 0.0064 0.0068	0.0037 0.0055 0.0058 0.0068	0.0034 0.0047 0.0051 0.0068	0.0032 0.0043 0.0047 0.0068	0.0028 0.0038 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068	0.0025 0.0033 0.0043 0.0068							
Length of engagement in terms of diameter			Minor diameter tolerances (Not applicable to diameters less than 0.25 in.)																
Tolerance ratios	Length of engagement in terms of diameter		Above	To and including	20 tpi	18 tpi	16 tpi	14 tpi	13 tpi	12 tpi	11 tpi	10 tpi	9 tpi	8 tpi	7 tpi	6 tpi	5 tpi	4.5 tpi	4 tpi
0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.5D 3D	0 0.0053 0.0066 0.0115 0.0144	in 0.0064 0.0095 0.0127 0.0159	in 0.0070 0.0118 0.0141 0.0178	in 0.0079 0.0093 0.0155 0.0192	in 0.0083 0.0122 0.0170 0.0223	in 0.0090 0.0133 0.0180 0.0233	in 0.0097 0.0146 0.0194 0.0242	in 0.0108 0.0151 0.0210 0.0263	in 0.0114 0.0158 0.0210 0.0264	in 0.0125 0.0171 0.0228 0.0312	in 0.0135 0.0181 0.0240 0.0344	in 0.0153 0.0207 0.0266 0.0323	in 0.0170 0.0223 0.0285 0.0343	in 0.0179 0.0226 0.0288 0.0348	in 0.0195 0.0243 0.0305 0.0365	in 0.0223 0.0271 0.0333 0.0393	in 0.0223 0.0271 0.0333 0.0393	

* Tolerances for lengths of engagement in terms of pitch should be selected from equivalent lengths of engagement in terms of diameter ranges.
If the minor diameter tolerance as selected from this table is less than the pitch diameter tolerance, use the latter. See Design of Special Threads in appendix A8.

TABLE 3.10. Minor diameter tolerances for internal special screw threads, class 3B
(UNS threads, see per. 10, p. 3.05.)

Tolerance based on basic major diameter of →				0.164	0.190	0.216	0.250	0.3125	0.375	0.4375	0.500	0.5625	0.625	0.6875	All larger diameters	
For diameter range Above →			0.033	0.151	0.177	0.203	0.233	0.281	0.344	0.406	0.469	0.531	0.594	0.656	0.656	
To and including →			0.151	0.177	0.203	0.233	0.281	0.344	0.406	0.469	0.531	0.594	0.656	0.719		
Threads per inch	Tolerance ratios	Length of engagement in terms of diameter*		3B Minor diameter tolerances ^b												
		Above ^c	To and including	(")	in	in										
80	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	....................	.0018 .0022 .0029 .0037	.0013 .0020 .0027 .0033	.0013 .0020 .0028 .0033	.0013 .0020 .0028 .0033	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....	..... ..... ..... .....
72	0.6 0.75 1.0 1.33	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0017 .0026 .0034	.0015 .0023 .0030	.0015 .0022 .0029	.0015 .0022 .0029	0.0015 0.0018 0.0018	0.0015 0.0018 0.0018	0.0015 0.0018 0.0018	0.0015 0.0018 0.0018	0.0015 0.0018 0.0018	0.0015 0.0018 0.0018	0.0015 0.0018 0.0018	0.0015 0.0018 0.0018
64	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0020 .0030 .0040	.0018 .0025 .0033	.0016 .0024 .0032	.0015 .0024 .0032	0.0015 0.0018 0.0018	0.0016 0.0018 0.0018	0.0016 0.0018 0.0018	0.0016 0.0018 0.0018	0.0016 0.0018 0.0018	0.0016 0.0018 0.0018	0.0016 0.0018 0.0018	0.0016 0.0018 0.0018
56	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0023 .0033 .0047	.0021 .0029 .0032	.0019 .0027 .0034	.0018 .0026 .0032	0.0018 0.0021 0.0021	0.0018 0.0021 0.0021	0.0018 0.0021 0.0021	0.0018 0.0021 0.0021	0.0018 0.0021 0.0021	0.0018 0.0021 0.0021	0.0018 0.0021 0.0021	0.0018 0.0021 0.0021
48	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0028 .0038 .0054	.0025 .0035 .0047	.0023 .0033 .0043	.0021 .0031 .0041	0.0021 0.0031 0.0033	0.0021 0.0031 0.0041	0.0021 0.0031 0.0041	0.0021 0.0031 0.0041	0.0021 0.0031 0.0041	0.0021 0.0031 0.0041	0.0021 0.0031 0.0041	0.0021 0.0031 0.0041
44	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0031 .0046 .0062	.0028 .0042 .0058	.0026 .0035 .0045	.0024 .0033 .0045	0.0024 0.0033 0.0045	0.0024 0.0033 0.0045	0.0024 0.0033 0.0045	0.0024 0.0033 0.0045	0.0024 0.0033 0.0045	0.0024 0.0033 0.0045	0.0024 0.0033 0.0045	0.0024 0.0033 0.0045
40	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0034 .0051 .0068	.0031 .0047 .0073	.0029 .0038 .0066	.0026 .0034 .0063	0.0024 0.0031 0.0063	0.0024 0.0031 0.0063	0.0024 0.0031 0.0063	0.0024 0.0031 0.0063	0.0024 0.0031 0.0063	0.0024 0.0031 0.0063	0.0024 0.0031 0.0063	0.0024 0.0031 0.0063
36	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0038 .0058 .0077	.0035 .0052 .0070	.0030 .0038 .0054	.0028 .0036 .0053	0.0028 0.0039 0.0053	0.0028 0.0039 0.0053	0.0028 0.0039 0.0053	0.0028 0.0039 0.0053	0.0028 0.0039 0.0053	0.0028 0.0039 0.0053	0.0028 0.0039 0.0053	0.0028 0.0039 0.0053
32	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0043 .0065 .0087	.0039 .0058 .0078	.0038 .0056 .0073	.0034 .0050 .0067	0.0030 0.0043 0.0060	0.0029 0.0043 0.0057	0.0029 0.0043 0.0057	0.0029 0.0043 0.0057	0.0029 0.0043 0.0057	0.0029 0.0043 0.0057	0.0029 0.0043 0.0057	0.0029 0.0043 0.0057
28	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0045 .0064 .0091	.0042 .0063 .0084	.0039 .0058 .0081	.0034 .0051 .0074	0.0032 0.0047 0.0064	0.0032 0.0047 0.0064	0.0032 0.0047 0.0064	0.0032 0.0047 0.0064	0.0032 0.0047 0.0064	0.0032 0.0047 0.0064	0.0032 0.0047 0.0064	0.0032 0.0047 0.0064
27	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0047 .0071 .0094	.0044 .0068 .0087	.0040 .0059 .0080	.0036 .0053 .0071	0.0032 0.0048 0.0065	0.0032 0.0048 0.0065	0.0032 0.0048 0.0065	0.0032 0.0048 0.0065	0.0032 0.0048 0.0065	0.0032 0.0048 0.0065	0.0032 0.0048 0.0065	0.0032 0.0048 0.0065
24	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0051 .0073 .0108	.0049 .0073 .0091	.0045 .0068 .0084	.0040 .0060 .0078	0.0037 0.0053 .0091	0.0037 0.0053 .0073	0.0037 0.0053 .0073	0.0037 0.0053 .0073	0.0037 0.0053 .0073	0.0037 0.0053 .0073	0.0037 0.0053 .0073	0.0037 0.0053 .0073
20	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0053 .0079 .0113	.0049 .0073 .0113	.0045 .0068 .0092	.0040 .0060 .0092	0.0037 0.0053 .0092	0.0037 0.0053 .0092	0.0037 0.0053 .0092	0.0037 0.0053 .0092	0.0037 0.0053 .0092	0.0037 0.0053 .0092	0.0037 0.0053 .0092	0.0037 0.0053 .0092
18	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0054 .0081 .0106	.0048 .0073 .0096	.0045 .0068 .0096	.0040 .0060 .0096	0.0035 0.0051 .0096	0.0035 0.0051 .0096	0.0035 0.0051 .0096	0.0035 0.0051 .0096	0.0035 0.0051 .0096	0.0035 0.0051 .0096	0.0035 0.0051 .0096	0.0035 0.0051 .0096
16	0.5 0.75 1.0 1.25	0 0.33D 0.67D 1.33D	0.33D 0.67D 1.33D	...............	.0055 .0082 .0106	.0049 .0073 .0102	.0045 .0068 .0096	.0040 .0060 .0096	0.0034 0.0051 .0096	0.0034 0.0051 .0096	0.0034 0.0051 .0096	0.0034 0.0051 .0096	0.0034 0.0051 .0096	0.0034 0.0051 .0096	0.0034 0.0051 .0096	0.0034 0.0051 .0096

* Tolerances for lengths of engagement in terms of pitch should be selected from equivalent lengths of engagement in terms of diameter ranges.

^b If the minor-diameter tolerance as selected from the table is less than pitch-diameter tolerance, use the latter. See Design of Special Threads in appendix A3.

^c For 0.151 in diam sizes and smaller, tolerance values for all three classes are the same. For these smaller sizes, tolerance values are given in table 3.9.

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TABLE 3.10. Minor diameter tolerances for internal special screw threads, class 3B—Continued
(UNS threads, see par. 10, p. 3-05.)

Tolerance based on basic major diameter of—			0.375	0.4375	0.500	0.5625	0.625	0.6875	0.750	0.8125	0.875	0.9375	All larger diameters
For diameter range Above →			0.314	0.406	0.489	0.531	0.594	0.656	0.710	0.761	0.814	0.908	
To and including →			0.406	0.489	0.531	0.594	0.656	0.719	0.781	0.844	0.908	0.969	
Threads per inch	Tolerance ratios	Length of engagement in terms of diameter*	3B										
		Above	in	in	in	in	in	in	in	in	in	in	in
		to and including											
14	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 0.33D 3D	.0058 .0068 .0118 .0114	.0054 .0062 .0109 .0130	.0053 .0078 .0104 .0120	.0050 .0078 .0100 .0123	.0049 .0078 .0093 .0122	.0047 .0078 .0093 .0118	.0046 .0068 .0091 .0113	.0044 .0067 .0091 .0110	.0044 .0066 .0089 .0110	
13	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0058 .0067 .0117 .0148	.0066 .0063 .0111 .0139	.0064 .0080 .0107 .0134	.0063 .0078 .0104 .0130	.0060 .0076 .0101 .0126	.0059 .0073 .0099 .0124	.0049 .0073 .0097 .0123	.0048 .0071 .0094 .0119	.0047 .0070 .0094 .0118	
12	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0063 .0068 .0123 .0167	.0060 .0069 .0120 .0120	.0060 .0067 .0115 .0144	.0058 .0068 .0113 .0140	.0054 .0064 .0106 .0138	.0053 .0063 .0104 .0133	.0052 .0063 .0104 .0130	.0051 .0063 .0103 .0128	.0050 .0075 .0100 .0125	
11	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0063 .0068 .0123 .0167	.0060 .0069 .0117 .0156	.0060 .0067 .0117 .0161	.0058 .0068 .0117 .0166	.0055 .0065 .0116 .0144	.0054 .0064 .0116 .0140	.0053 .0063 .0112 .0138	.0052 .0062 .0110 .0136	.0051 .0062 .0109 .0136	
10	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0066 .0069 .0131 .0164	.0064 .0069 .0128 .0180	.0064 .0069 .0128 .0184	.0062 .0069 .0125 .0184	.0061 .0069 .0122 .0183	.0060 .0069 .0122 .0180	.0060 .0069 .0120 .0180	.0060 .0069 .0120 .0180	.0060 .0069 .0119 .0179	
9	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0068 .0069 .0137 .0171	.0066 .0069 .0137 .0171	.0066 .0069 .0137 .0171	.0065 .0069 .0136 .0168	.0067 .0069 .0136 .0166	.0066 .0069 .0136 .0166	.0066 .0069 .0135 .0165	.0066 .0069 .0135 .0165	.0066 .0069 .0135 .0165	
8	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0075 .0119 .0150 .0183	.0075 .0112 .0150 .0183								
7	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0086 .0129 .0171 .0214									
6	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0129 .0150 .0200 .0250									
5	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0130 .0140 .0160 .0200									
4.5	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0133 .0140 .0160 .0200									
4	0.8 0.75 1.0 1.25	0 0.25D 0.67D 1.8D	0.33D 0.33D 1.8D 3D	.0135 .0140 .0160 .0200									

See previous page for footnotes.

TABLE 3.11. Consolidated method for the calculation of dimensions of special threads

External thread		Internal thread			
Thread element	Class 1A	Class 1AR	Class 1A'	Class 1B	Class 1B
Max major dia	Nominal size minus allowances Table 1A Table 1B	Nominal size Table 1A Table 1B	Nominal size Table 1A	Nominal size Table 1B	Min major dia Table 1B
	(Use values tabulated in 1.1.6.1 or compute in accordance with directions for designing special threads in appendix A1. APPLY MINUS)			H/ND(.167H), table 1A, col. 1. APPLY PLUS	
Tolerance on major dia				Subtract 0.75H, table 1A, col. 14, from minimum major diameter shown above.	Table 1B APPLY PLUS
Min pitch dia				Subtract 1.5H, table 2A, col. 17, from the basic major diameter and round off to the nearest 0.001 in for sizes 0.125 in and larger. For sizes 0.125 in and smaller add 0.001 in to get the decimal place.	Table 1B APPLY PLUS
				Subtract 1.5H, table 2A, col. 17, from the basic major diameter and round off to the nearest 0.001 in for sizes 0.125 in and larger. For sizes 0.125 in and smaller add 0.001 in to get the decimal place.	Table 1B APPLY PLUS
Tolerance on pitch dia	Table 1A APPLY MINUS	Table 1A APPLY MINUS	Table 1A APPLY MINUS	Table 1A APPLY MINUS	Table 1B APPLY PLUS
Min minor dia				Subtract 17H/16(1.167H), table 2A, col. 16, from maximum major diameter. This is a reference dimension only.	Table 1B APPLY PLUS
				H/ND(.167H), table 2A, col. 6. APPLY MINUS	Tolerance on minor dia Table 1B

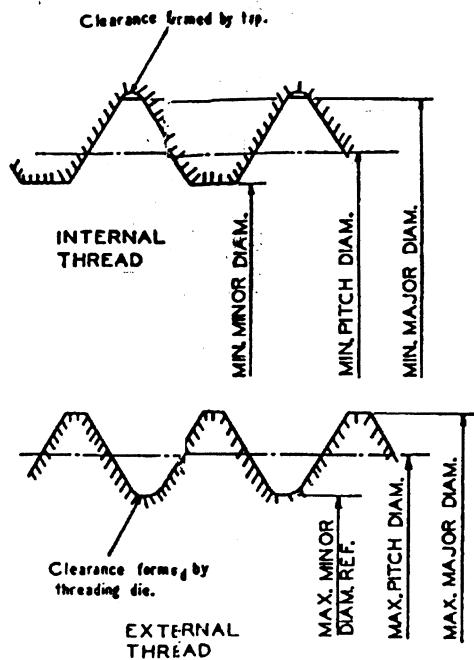


FIGURE 3.12. Thread dimensions to be determined for a special thread.

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Form of thread	3
Length of engagement	8
Limits of size	9
Preferred diameters and pitches	4
Selected combinations	(Table 3.1)
Tolerances	7
Types	2